THE IRON AGE

THURSDAY, OCTOBER 18, 1888.

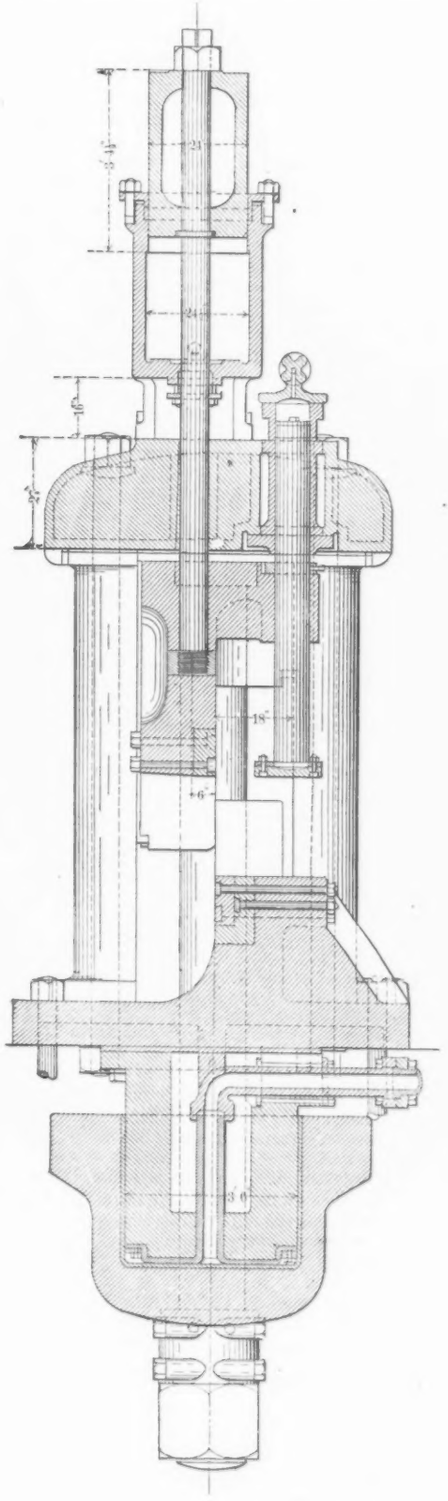


Fig. 1.—Section through A B, Fig. 2.

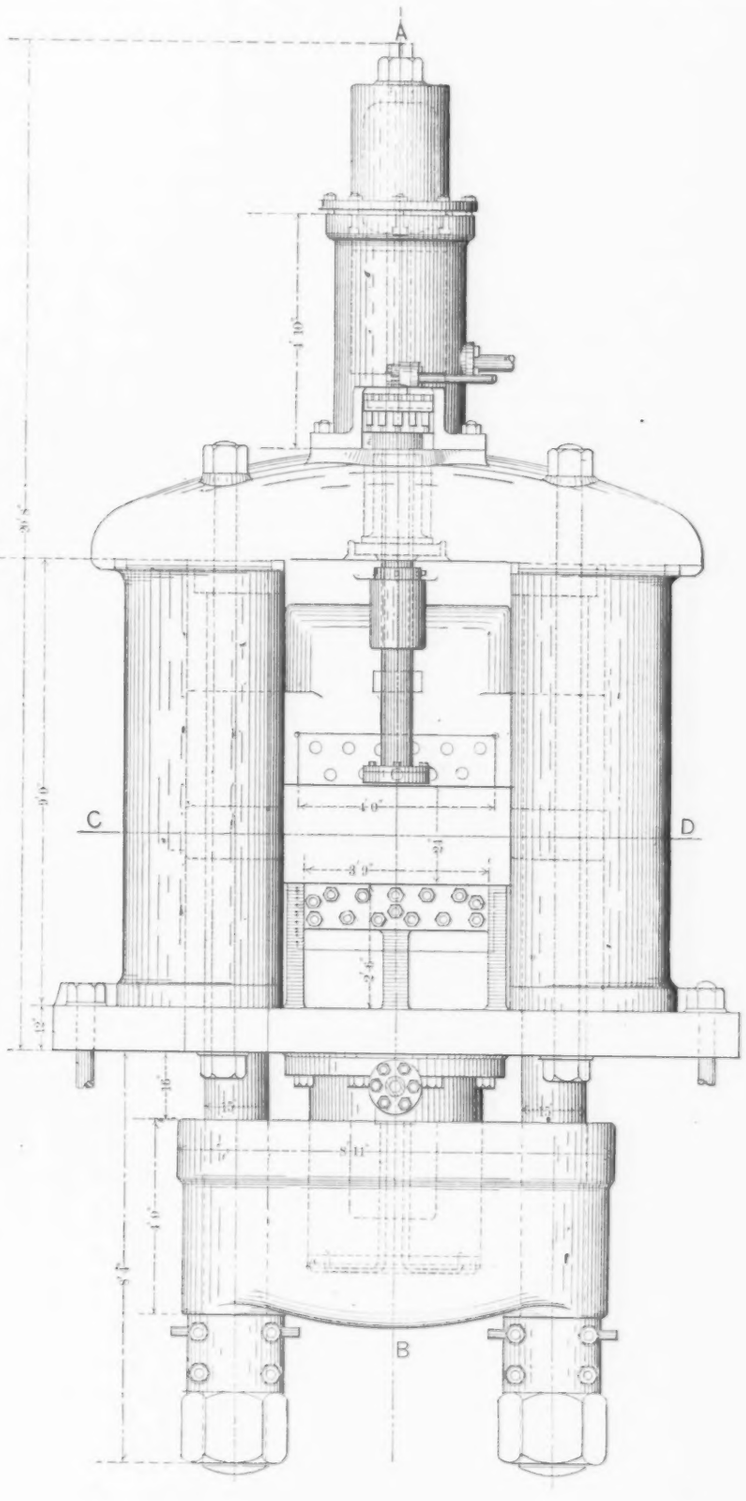


Fig. 2.—Front Elevation.

3000-TON SHEAR, HOMESTEAD STEEL WORKS, CARNEGIE, PHIPPS & CO.

A Three-Thousand Ton Shear.

The illustrations which we present herewith, while they show the construction, fail utterly to convey an adequate conception of the dimensions of what is undoubtedly the largest shear in the world. It has been in successful use for some time past at the Homestead Steel Works of Carnegie, Phipps & Co., at Munhall, near Pittsburgh, Pa. It is rated at 3000 tons, and is a part of the famous slabbing mill. Briefly stated, the shear is operated by the descent of the upper blade, which is effected by the introduction of water at a pressure of 4000 pounds per square inch, into the cylinder shown in the lower part of our engraving. The plunger is stationary, the cylinder proper being forced downward. This motion is transferred to the casting, which carries the upper blade

by the two 15-inch bolts shown in the drawing. These two bolts, it may be stated, are forgings specially made by Whitworth for this shear. The cylinder, if it may so be called, is a very heavy steel casting, weighing, as it does, 54,600 pounds. It is 13 inches thick on the bottom and 17½ inches thick on the sides, and is 37 inches deep. Its width from center to center of the two 15-inch bolts is 6 feet 6 inches, and its total width 8 feet 11 inches. The cross piece carrying the upper blade was a particularly difficult steel casting to make. It will be observed that it is brought back into place by a special lifting cylinder placed on top of the shear. The small hydraulic cylinder shown back of the blade in Fig. 1, with its long plunger, is the gag to hold down the slab or billet to be sheared when it becomes so short that its weight is not great enough to prevent its tipping while the shear is operating. The shear has a capacity to cut steel 48 inches wide and 24 inches thick. The blades proper are made of crucible steel, double diamond in section. These knives are being used in all the shears at Homestead. The shear was built by the Morgan Engineering Company, of Alliance, Ohio. A study of the dimensions inscribed in our drawings will afford some idea of the magnitude. It is over 15 feet high over all, the top of the frame proper over 11 feet high.

Electric Welding.

In a paper on "Electric Welding," presented at the Scranton meeting of the American Society of Mechanical Engineers, this week, Mr. C. J. H. Woodbury explained that the process enables the welding of any two pieces of the same metal or alloy ranging from the most refractory metals to the alloy which fuses at 162° F. It will join dissimilar metals when the welding point of one is not too far in excess of the fusion point of the other.

These results seem to indicate that the classification of metals into welding and non-welding has been due to imperfections in the ordinary and time-honored methods, rather than any peculiarity in physical constitution warranting such arbitrary classification. The process is far cheaper than that of hand welding, and also extends to other methods of manufacture, but the comparative expense differs according to the previous conditions in every place where it has been applied thus far. Its applications in practical work thus far have been confined to butt-welding for many purposes, such as continuous wire work, carriage work, axles and tires, cotton bale ties, barrel hoops and wire cables and many miscellaneous purposes. Axes are made of drop forgings, joining the tool steel edge to a mild steel poll, bars are heated in the middle and upset, forming collars, and pipes are joined together—a matter of great value in ice machines. The list might be continued to greater length, but this indicates the range of its practical uses at this early day.

The value of the process, for most purposes, independent from any scientific interest or mechanical ingenuity shown in the apparatus, must be that of the resistance of the welds under tensile stress. It will be readily understood, however, that, as this process accomplishes many things hitherto impossible, aside from any question of ultimate strength, it is fitted for applications in many constructions where it saves labor and time; provided only that the joints be in all cases sufficiently good for the purpose for which the article is designed. A large field thus opens up in the execution of ornamental design in metal work, where it will supplant screws, rivets or solder for fastenings, and in other evident applications. We would add that the machines by which the welding is accomplished were illustrated and described in *The Iron Age* of July 12, 1888.

Hot-Air Heating and Ventilating.

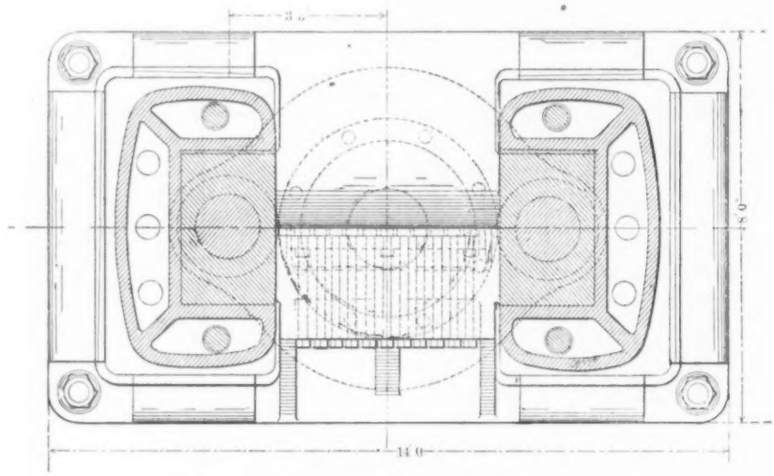
The system of hot-air heating and ventilating by means of a fan in connection with a steam heater, through which the air is forced wherever required, is now being rapidly introduced. In view of the interest attached to it we need offer no apology for again referring to the subject, illustrations of some of the details of the plant having appeared in *The Iron Age* for February 2, 1888. It possesses not only the special advantages of supplying an ample quantity of fresh air, but many others that make it preferable to steam-heating by direct radiation.

In this system a combination is made of the heating and ventilating arrangements, thereby reducing the running expenses which would be incurred by the two running independently. Simply stated, the method of application is as follows: Fresh air from out of doors is conducted to a specially constructed steam-heater, through which it is rapidly drawn by means of a fan which discharges from its mouth the air thus heated. By means of a properly arranged system of distributing ducts this air is delivered to the various rooms of the building. The air passages should if possible be built into the walls, but under other circumstances may be constructed of galvanized iron. The position of the outlets may be varied to suit local conditions. In manufacturing establishments where galvanized iron ducts are used, they are usually suspended from the ceiling and extended centrally the entire length of the room, and branches or outlets are taken out at desirable points. In order to save material and to preserve an equality of pressure, the main pipe is usually reduced in diameter proportionally to the branches taken out.

The apparatus in its most approved form is manufactured by B. F. Sturtevant, of Boston. The heater is made up of independent cast-iron sections, into which are screwed wrought-iron pipes which connect at the top and serve as a passage for steam from one end of the section to the other. A circulation of steam is kept up through these pipes and bases, the water of condensation being removed by means of a steam trap. It is claimed that a great reduction in the amount of pipe required to do a given amount of heating is made when the hot-blast steam-heating apparatus is used. The high velocity of the air crossing the pipes causes a very rapid condensation of the steam, and only one-third to one-fifth the pipe is required that is necessary in the system of direct radiation.

The entire heater is inclosed in a steel-plate jacket, which precludes all possibility of fire. The steam fan immediately joins the heater and is of a type specially designed for ventilating, being able to handle large volumes of air at a very small expenditure of power. Motive power for the fan is derived from a direct-connected upright engine, the exhaust from which is used in the heater. The cost of running the blower is thus reduced to practically nothing, for the heating power of exhaust steam is only about 3 per cent. less than that of live steam. The engine cylinder may, consequently, be considered as simply an enlargement in the steam-pipe on its way to the heater.

Instead of a large number of air-cocks and valves through the building there are in this apparatus only the few valves on the heater and engine to be attended to, and these are but a few feet apart. The entire apparatus occupies but little space, and that where it is generally of little value. Registers in the inlets into the separate rooms serve, at the discretion of their occupants, to preserve the proper atmospheric conditions. The amount of air and its temperature and humidity are directly under control.



3000-Ton Shear.—Fig 3.—Section through C D, Fig. 2.

In theaters and halls of audience this system finds its most complicated, but, nevertheless, its most satisfactory application. Naturally, in such buildings, where the occupants are very closely seated, the greatest need is felt for perfect ventilation, and no system is successful that is not positive, and none is positive except that dependent upon the propulsion of the air by means of a fan. Commercially speaking, however, as an accessory to different processes of manufacturing, it is the most valuable. In the various methods of drying such materials as lumber, wool, cloth, grain, tobacco, glue, &c., the effort has always been to secure a circulation of the heated air. Certainly nothing can be more reasonable than to make the circulation sure and positive by means of a fan.

A direct telephonic line has now been established between Paris and Marseilles. The charge for five minutes' conversation between the two cities has been fixed at about 60 cents. Conversations between Paris and Lyons will also be practicable by the new line, as well as between Lyons and Marseilles.

Iron ore from Catorce, in Mexico, will be shipped to the United States as soon as a branch of the Mexican National Railroad can be constructed.

English Engineering Supplies.

What is probably the most complete English catalogue that we have yet seen has just been sent us by Messrs. John Birch & Co., engineers and merchants, of Liverpool, England. It relates to railroads and rolling stock, giving the cost of plant and material for portable, light and main lines, and containing also chapters on river steamers and light craft and dredging plant. Those who have become familiar with the ordinary run of English trade catalogues will find the present one a decided departure from the general type, the care which has been given to its preparatiou putting it, so far as the giving of information is concerned, on a level with many of the elaborate and pretentious American specimens. It is a book measuring 8½ x 12 inches, and embraces 232 pages, and is profusely illustrated, the engravings showing all the different forms of devices and machinery which the firm are prepared to supply to intending purchasers. One of the principal features of the catalogue which will strike the examiner at once is the complete system of code words which has been adopted, and by which not only each article, be it either a railway car or a locomotive has its word for reference and cable, but every probable modification and extra which would be required in connection with it is also coded. We need not, therefore, specially point out that the book would be of great benefit particularly to the buyer or engineer in distant countries, for whom apparently it has been specially designed, and who without such a book would probably be obliged to correspond for many weeks with agents in manufacturing centers. As intimated, the book treats of both portable railways and main line works, the former being taken up first. Then come descriptions of cars and rolling stock generally, followed by particulars and engravings of locomotives, turn-tables, water tanks and columns, dredges, &c. Concluding chapters are given on light railways, steam launches and dredging plants, these latter often being useful in connection with railway systems and contractors' work. A carefully prepared index also is given, which adds very much to convenience in looking up any particular piece of machinery. A number of blank sheets make up the final portion of the catalogue, and are intended for the convenience of inserting supplementary pages which may be issued from time to time.

A New Torpedo.—For some time past experiments with a new form of torpedo have been conducted at College Point, L. I., by the Naval Board of Ordnance. The torpedo is the work of Messrs. George A. Haight and William H. Wood, and is of the well-known cigar design. It is propelled by carbonic acid gas and is controlled by electricity. It is about 40 feet long and 24 inches in diameter, and is supported under water by a second cigar-shaped float of somewhat greater length. Tests which were recently made with the Navy Yard tug Nina seem to have given very satisfactory results. The Nina was used as a target, being anchored behind a torpedo net about ¼ mile from the point of discharge For the trial the netting was not of very strong make, and the explosive charge consisted of only a small can of powder. The distance was traversed in a little less than three minutes, the torpedo cutting clean through the netting, showing that under practical working conditions it would have brought about disastrous results to the target.

It is of some interest to note that the French Minister of War has published in *Instructions sur l'armement de l'infantrie* an illustrated description of the much-talked-of Lebel rifle, of which 350,000 are now being issued to the French army. The construction of the rifle has for some time been a jealously guarded secret, and the publication accordingly is denounced by many French journals as a serious mistake.

The Rapid City School of Mines.

A representative of *The Iron Age* had occasion lately to visit the School of Mines, at Rapid City, Dak., and was much surprised to find such a noble beginning made for a technical school in that distant locality. There are two buildings, both built of brick, located far enough apart to make wings for a main building which is intended to be located between them, according to the original design. One building contains the Dean's office, a well-equipped laboratory and a furnace-room on the ground floor, a large lecture-room and classrooms on the second floor, and a very large cabinet of mineralogical specimens on the third floor. The other building is not completely finished, needing a little more work on some of the rooms, but it contains several rooms to be used for laboratories, and one large room on the ground floor which is now supplied with a complete plant for milling and concentrating ores. A 40 horse-power steam engine furnishes the power to crushers, stamps, cornish rolls, jigs, vanners, &c. Mill runs are made of gold, silver and tin ores, &c., which are brought here to be tested from various parts of the Black Hills. The school having been erected by the Territory of Dakota, and, being supported from the public funds, its facilities are open to the public, who are asked merely to pay the cost of the tests which they wish to have made. All experiments in the use of machinery or in milling and concentrating ores of diverse characteristics are open to all who choose to apply for the results. A furnace for smelting tin concentrates has been partly completed and will be finished as soon as next year's appropriation becomes available. F. R. Carpenter is Dean of the school, and among the faculty is Prof. H. O. Hofman, late of the Institute of Technology, Boston. This institution is hardly three years old as yet, but it is exerting a marked influence in directing the intelligent development of the wonderful mineral resources of the Black Hills. The plan upon which it is based is regarded as so eminently adapted to its purpose that it has been taken as a model by one or more of the Australian colonies in organizing a similar school. Over 40 students received instruction within its walls last year, which number will probably be increased this winter. A peculiar feature of the school is the number of practical miners who avail themselves during the winter of the opportunity presented to them for acquiring a thorough knowledge of mineralogy. The situation of the school is highly advantageous by reason of its proximity to gold, silver, lead, zinc, tin, iron, coal and other mines, which are all within a few hours' ride, so that the student can with little loss of time from his studies observe the practical details of mining almost all the minerals in ordinary use and some which are quite rare.

A correspondent of the London *Economist* reports that an English syndicate has just bought a large concern in Hagen, Westphalia, whose specialty is the manufacture of iron and tools, and is about to make a joint-stock concern out of the same. According to a perhaps prejudiced statement, it would look as if it was intended to evade the British Merchandise act by providing the goods manufactured in Hagen with the stamp of a British firm.

The Growth of West Superior.

The growth of West Superior, among the rising cities of the Northwest, is unique. Within three years its real estate valuation has risen from $500,000 to hardly less than $10,000,000. In 1885 the first transfers of lands, and which now forms the site of West Superior, were made to the Land and River Improvement Company, of New Jersey, a corporation organized for the special purpose of building a city at the head of Lake Superior. Its stockholders and directors were New York capitalists, merchants and lawyers and Northwestern railroad men. Their entire purchase included a trifle over 4000 acres, constituting the apex of a peninsula formed by St. Louis River and Bay and Superior Bay, including a shore line front of over ten miles, and bearing about the same relationship to the great harbor at the head of Lake Superior that Manhattan Island does New York Harbor. The original Bay of Superior (now divided into Duluth Harbor, Superior Bay and Allouez Bay), is a magnificient stretch of water, 7 miles in length and 1½ in breadth, perfectly guarded from lake tempests by two narrow strips of land, which reach out across the head of the lake from both the Minnesota and the Wisconsin shores. West Superior, connected with five of the great railway systems of the Northwest, claims special advantage as a point of shipment between Nebraska, Colorado and Dakota to other points on Lakes Erie, Huron and Ontario, and has full confidence in her commercial future. Besides extensive mercantile docks, one of them 2900 feet in length, elevators of 8,300,000 bushels capacity and large steamship, grain and coal interests, West Superior has in course of establishment a large steel works and furnace plant under the auspices of the Land and River Improvement Company.

Last July the work of construction on the foundry building, 356 x 85 feet, was commenced, and the various auxiliary buildings let to contract. The plans as drawn contemplated a plant covering 200 acres of land. Dredging for a large coal dock has been going on ever since, and the walls of the foundry building are almost up. A very large furnace plant was included in the plans, and it was expected that one 200-ton furnace would have been erected this fall, but there is unexpected delay. It is in contemplation, however, to expend fully $500,000 next year, with the result of bringing into existence one of the largest manufacturing plants in the West.

New Armington & Sims Engines.—The Armington & Sims Engine Company, of Providence, R. I., have recently brought out several new designs of engines, which, in many respects, are interesting, and of which we have been supplied with photographs. One of these shows a plant recently furnished for the United States cruiser Boston, for electric lighting, the engine being of the double-cylinder, double-acting design, to which we had occasion to refer some months ago. The valves for both cylinders are controlled by the well-known Armington & Sims automatic governor. The engine itself is very compact and can be run at high speed. It is connected to the dynamo by gearing. A plant of the same general type, but to couple direct to the dynamo with a flexible coupling, is at present being built for the cruiser Baltimore The second photograph shows a compound condensing engine of 100 horse-power, being one of five built for the machine shops of the Ordnance Department, at the Washington Navy Yard. The cylinders are placed side by side, with the cranks opposite. The engines are perfectly balanced, can be run at a high speed and are particularly

well adapted for electric lighting. Compactness in both designs is a very noticeable feature, and will no doubt do much to commend the engines favorably.

Captain Jones's Reply.

Captain William R. Jones, general manager of the Edgar Thomson and Homestead Steel Works, has sent a letter to the *Ironmonger*, in which he replies to the curious comments made by our contemporary on American steel practice, taking Captain Jones's remarks at the meeting of the Iron and Steel Institute as a text. We printed both the report and the editorial comment, and may now close the incident, as the French politicians put it, by quoting the following:

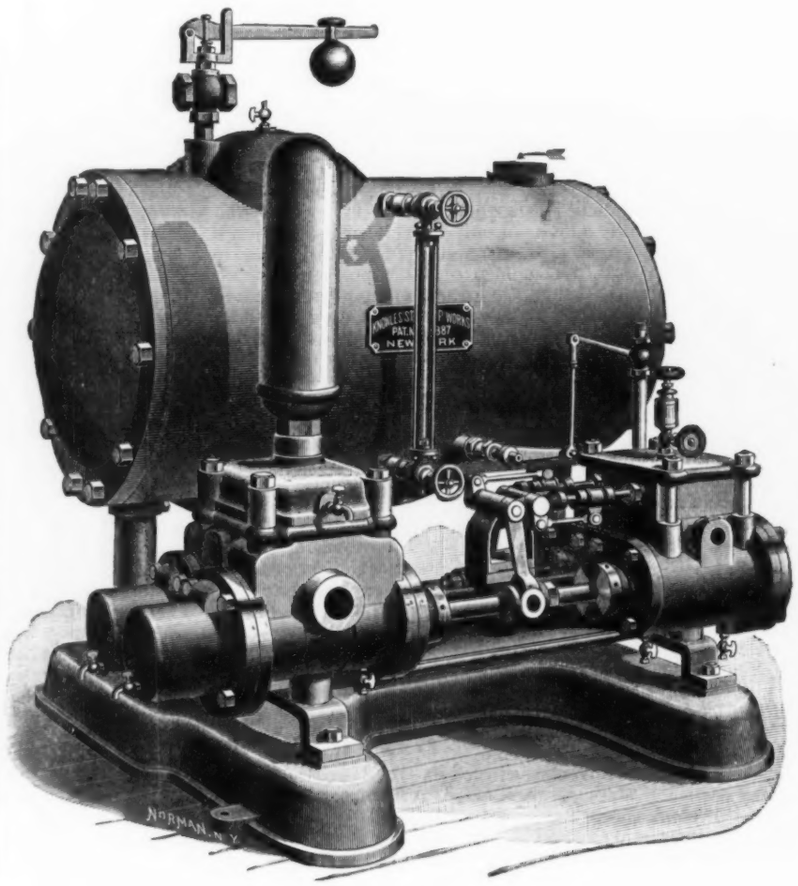
The remarks I made at the Edinburgh meeting were prompted by a remark made by Mr. Clark—viz., that punching the steel was a good way to test it; and he was followed by Mr. Cooper, who stated that from conversation with American engineers he was surprised at their lack of confidence in steel as a material for bridge construction. The story I told of seeing a heat made in eight minutes I will tell again, and more fully. Visiting a steelworks making at the time of my visit soft steel, I saw them blow the heat in eight minutes; as soon as the vessel was turned down the ferromanganese (which had been drawn from a heating furnace, but at the time of being put in the ladle was cold) was added. The metal was at once poured into the mold, and I believe the reaction is still going on in that steel. I might add to this by saying that the gifted genius who made steel as described above was so uniformly successful in making bad steel that he involuntarily retired from the business; but in the meantime he had done a great deal to lead engineers to believe that Bessemer steel was not a reliable material. The average daily output of the leading Bessemer works in America will range from 900 to 1100 tons, and the work is done easily and readily, and done thoroughly well; and in my judgment no better steel is made anywhere, either Bessemer or open-hearth, than is made in America. After reviewing the principal Bessemer works on this side, I am compelled to believe that the American steel makers have good reason to be proud of their success, and we certainly are the equals of any in producing good, reliable steel.

A New Roller Bearing.—Mr. R. W. Hent, of San Francisco, Cal., has invented an improved roller bearing of the class bearing directly on both the shaft and casing, and a series of separating rollers of smaller diameter bearing neither on the shaft nor casing, but on the bearing rollers, to keep the latter separate from each other, and in which the separating rollers are kept from contact with the shaft by their bearing on the bearing rollers and from contact with the casing by their bearing on an encircling ring. This ring having only the separating rollers for its bearings, its axis is liable to shift from the axis of the shaft, and the object of Mr. Hent's invention is to limit this shifting by interposing the ring between journals of the bearing rollers on its periphery and journals of the separating rollers on its inner side, the two series of rollers being so arranged relatively to each other and their journals made the proper dimensions to insure rolling and prevent rubbing contact. This ring bears at its periphery on journals of the bearing rollers as well as at its inner side on journals of the separating rollers. It is claimed that this roller bearing is specially adapted for journals in which there is little wear, such as window pulleys and sliding door rollers. It is controlled by the San Francisco Roller Bearings Company.

The Swinerton locomotive, with polygonal drivers, first brought to notice about a year ago, has again appeared on the surface. A number of improvements are said to have been made in her machinery, and the engine is now reported running on the Boston and Maine Railroad.

Automatic Feed Pump and Receiver.

We present on this page an engraving of a new design of feed pump with receiver just brought out by the Knowles Steam Pump Works, of Boston and New York. The combination is specially intended for draining coils, radiators, heaters, drying cylinders, steam jackets, &c., and feeding the water of condensation in its hottest condition direct to the steam boilers. It is reliable and entirely automatic in its operation. It does away with the expense and annoyance of traps and tanks and returns the condensed steam to the boiler in a steady, continuous flow as fast as it accumulates in the receiver above the pump. It is not affected by the variation of steam pressure, and is claimed to entirely prevent all snapping and "water-hammer" in pipes, so often caused by the use of traps having intermittent action. The pump and receiver can, of course, be used for other purposes than those just mentioned, as, for example, the regulation of brine circulation in refrigerating machinery and circulating purposes generally.



IMPROVED AUTOMATIC PUMP AND RECEIVER, BUILT BY THE KNOWLES STEAM PUMP WORKS, NEW YORK.

The operation of the outfit will, no doubt, be readily understood. The condensed steam or other liquid enters by the inlet nozzles at the top, shown at the right, and gravitates to the bottom of the receiver. As soon as it rises to a certain level it raises a float, which through lever connections, shown in the engravings, starts the pump. The latter takes off the water and forces it into the boiler. The speed of the pump is regulated through the float, and depends upon the quantity of water flowing in—the larger the quantity of water, the faster the pump moves. The pump slows down as the supply of water drops off, and when it ceases the pump stops entirely. The hollow copper float cannot fill with water by "sweating" or by actual leakage, as it is drained from the bottom through the hollow arm and axis. The interior of the float is in communication with the outside atmosphere. It will be noticed that in this new design the receiver is placed alongside the pump instead of overhead as in the older form. The latter, however, is also being turned out. The outfit is made in three sizes with capacities ranging from 9 to 58 gallons per minute.

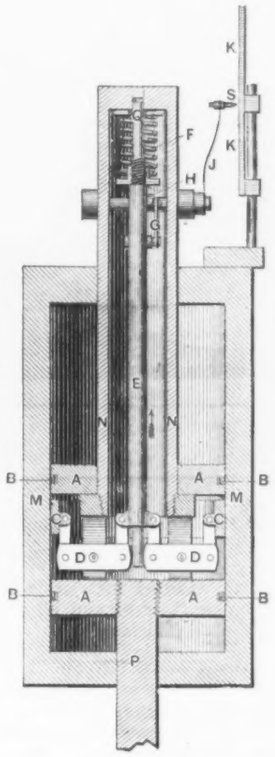
In a book on surveying, published in Germany, by Jacob Koebel, about 340 years ago, the author gives the following instruction, accompanied by a wood cut, as to how the length of a foot is to be found: "To find the length of a rood in the right and lawful way, and according to scientific usage, you shall do as follows: Stand at the door of a church on a Sunday and bid 16 men to stop, tall ones and small ones, as they happen to pass out when the service is finished; then make them put their left feet one behind the other, and the length thus obtained shall be a right and lawful rood to measure and survey the land with, and the sixteenth part of it shall be a right and lawful foot."

Twenty-seven boys on the nautical schoolship St. Mary's graduated at the annual examination last week. Since the school was established, in 1873, 477 boys have graduated, and fully 72 per cent. are now at sea. After dinner the boys gave an exhibition of seamanship aloft, after which the boys were mustered on deck and Captain Crowninshield addressed them. Shipowners and others were appealed to by Captain Samuels to provide places for graduates on American ships.

Friction of Piston-Packing Rings.

At the Scranton meeting of the American Society of Mechanical Engineers this week Mr. J. E. Denton gave an account of some measurements of the friction of piston-packing rings in steam cylinders with a device consisting essentially of the following arrangement:

A cylinder, M, 6 inches bore by 9 inches stroke is fitted with a piston, A, long enough to permit a packing ring, C, 1 inch wide to occupy the position shown. The ordinary packing rings B B prevent the access of steam into the space * immediately surrounding C. The latter is supported upon the outer ends of the levers D D, which are pivoted at O, and have their inner ends coupled to the rod E. Motion is given to the piston A and its attachments through the piston-rod P. Motion being in the direction of the arrow, the friction of the ring C tilts the levers D, thus compressing the spring F. The resulting movement of the rod E, relative to the incasing tube N gives motion to a pencil lever, J, through the pitman G and the crank H. Consequently



Apparatus for Measuring Friction of Piston Packing Rings.

the motion of the pencil S perpendicular to the plane of the paper is proportional to the amount of friction of the ring C.

The pencil makes a diagram resembling a rectangle upon paper fastened to a board, K K. The ring C is cut once and is provided with a device, by the means of which its tension may be adjusted by a spring. Means are also provided whereby the ring may be drawn together so as not to touch the sides of the cylinder. When in the latter condition the spring F is calibrated by loading the rod E at Q with known weights and noting the resulting movement of the pencil S. The spring actually resisting the motion of the levers D is the torsion of the pivots O. The spring F is merely shown as an illustration of spring action.

Fac similes of diagrams obtained were presented. The horizontal distances on each side of a center or zero line represent the friction on an up or a down stroke of the piston, the scale employed in the cases presented having been 250 pounds per inch.

* This space is kept drained of condensed steam.

The Coke Trade.

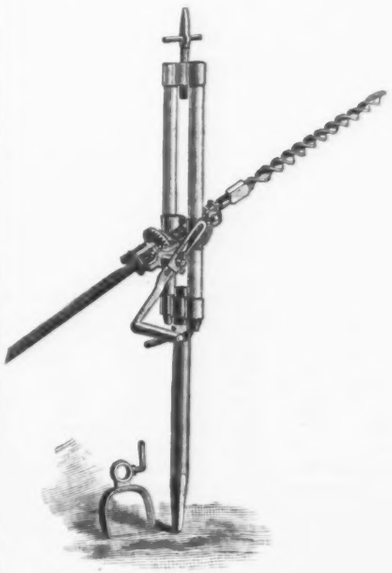
The one serious drawback to the coke industry at the present time is the shortage of cars, and the outlook for better shipping facilities in the near future is not encouraging. It is believed that if the car supply were equal to the demand the shipments of coke from the Connellsville region would be larger than at any time in its history. This statement is based on the present demand, which is greatly in excess of shipments, owing to the shortage of cars. For the months of August and September the output has steadily increased, until last week it aggregated 116,095 tons, which is an increase over the previous week of 550 tons. This increase is accounted for in part by the firing up of 100 ovens at the plant of the Connellsville Coke and Iron Company at Leisenring. The output for the month of September aggregated 438,307 tons, an increase of 45,035 tons over August, when the output was 393,272 tons. The shipments for the week closing on Saturday, the 6th inst., amounted to 5648 cars, distributed as follows: West of Pittsburgh, 3348 cars; Pittsburgh and rivers, 1100 cars; east of Pittsburgh, 1200 cars. These figures show a falling off of 695 cars over the previous week. The falling off was general, the Western shipments alone having decreased 425 cars, Pittsburgh shipments 100 cars, and Eastern shipments 170 cars. The shipments for September reached a grand total of 25,326 cars, distributed as follows: West of Pittsburgh, 13,916; Pittsburgh and rivers, 5270; East, 6140. This is an increase of 876 cars over August shipments. The September shipments averaged 1012 cars per day, as against 906 during August. The active ovens in the region now number 11,339, leaving but 1721 idle. One month ago there were 10,103 active and 2975 idle ovens. Prices remain at $1 per ton, although some sales have been made and are still being made at $1.15 and $1.25 per ton. It is not expected that there will be any advance in the price for some time yet. The continued heavy shipments of outside coke to the various centers of supply, together with the disadvantages of the car shortage, will prevent the prices from advancing. No further attempts have been made looking to the formation of a coke syndicate, and all efforts to form one have been abandoned for the present, at least.

In the line of high chimneys, some interest is attached to the stack which has just been completed for the Clark Thread Company, at Newark, N. J. It is the highest chimney in the United States, and, for that matter, probably in the world. Three higher stacks are cited as existing in Scotland, but they were built for carrying off noxious fumes from chemical works, and not for creating a draft for steam-boiler furnaces. These chimneys are Townsend's, at Port Dundas, Glasgow, which is 454 feet high; Saint Rollox, at Glasgow, 436½ feet high, and Dobson & Barlow's, at Bolton, 367 feet high. The Clark chimney is 335 feet high, and supplies draft for 29 boilers, having an aggregate capacity of 4000 horse-power. The cost of the chimney is said to have been $35,000.

It is much to be regretted that the question of a uniform coupling for continuous steam heating has not been decided ere this. The want of uniformity will do much to retard the settlement of a question that in other respects is progressing in a very satisfactory manner.

New Coal-Drilling Machine.

The Western Machine Works, of Ottumwa, Iowa, are bringing out the improved coal-drilling machine which we illustrate on this page. The cut will enable any one to understand, almost at a glance, its arrangement when in working position, making a description practically unnecessary. The machine is light and easily adjusted. By attaching the boot (which accompanies each machine) to the post extension a coal grip is available, which is securely fastened in the face of



New Coal-Drilling Machine.

the coal with the accompanying taper wedge, on which the side or direct motion will operate the same as on the post. This enables the miner to use the machine in any depth coal.

The Cost of Making Car Wheels.—E. Warne, of Easton, Pa., has printed figures, obtained from the Taylor Iron Works, at High Bridge, N. J., on the cost of making car wheels. It is based on the use of three-quarters of charcoal pig at $26.50 per ton and one-quarter old wheels, at $19 per ton, equal to $24.62 per ton for the stock, four wheels being made from one ton:

Iron	$6.16
Melting, core drying	.20
Sand, molds and cores, flour and facing	.15
Foundry labor of molding and casting	.85
Outside work, unloading materials	.10
Repairs, wear and tear, taxes, insurance, motive power and delivery charges	.40
Cost	$7.86

With wheels selling at $8 apiece, this would leave a profit of 14 cents per wheel.

It is of some interest to note that a class in the theory and practice of steam engineering will be formed next month by the Young Men's Christian Association, of New York. The class will commence on November 14, and will meet Wednesday and Friday evenings from 8 until 10 o'clock, the term closing on April 29, 1889. The purpose of the class is to give instruction in those subjects which must be mastered to enable one to pass an examination for an engineer's license before the New York Police Department. Only iron-works employees or those who are working in machine shops or fire and engine rooms will be admitted as pupils. The services of Mr. William H. Weightman as instructor have been secured.

Moisture in Iron Ore.

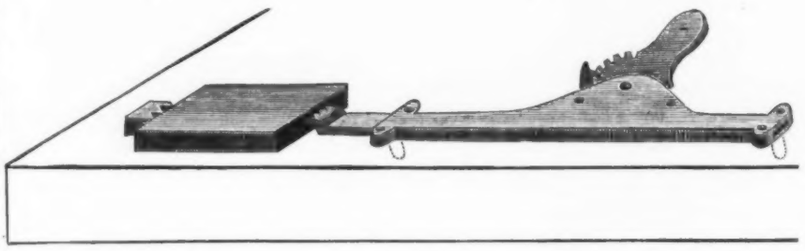
Several iron importers have been engaged in a legal contest with the United States Government respecting the payment of duties on moisture in iron ore, or only on the ore itself. At Philadelphia, on the 12th inst., Judges McKennan and Butler, of the United States Circuit Court, took up the suits by John W. S. Earnshaw, an importer of that city, and by Sebastian B. Schlessinger, Clark L. Lehman, J. Mitchell Clark and Ludwig Dreier, of the iron house of Naylor & Co., of Boston and Philadelphia, against John Cadwalader, collector of customs. Mr. Earnshaw brings his suit to recover an alleged excess of custom duties amounting to $71.61 on three importations of iron ore. Naylor & Co. claim $371.61. The bill of complaint alleges that in importing say 1000 tons of ore, the article will contain at least 10 per cent. of moisture, and if the ore is placed in open air where the sun can strike it there will be a shrinkage from 1000 tons to about 900 tons. It is urged that the 75 cents per ton duty can be collected only on the real importation and not on the moisture.

Mr. Isaac Fegeley, president of the Warwick Iron Company, of Pottstown, was one of several witnesses called by the plaintiffs, who testified that iron ore is bought and sold on a basis of being dried at 212°. William W. Thurston, president of the Bethlehem Iron Works, and who employs 3000 men, testified that he had purchased iron ore since 1883, and dealers always, with one exception, treated the water, which was mechanically and not chemically, combined with the ore, as distinct, and not a part of the ore, and trade was done on a basis of its being heated to 212°. At the close of the plaintiff's case, Assistant District Attorney Carr made a motion for a non-suit, on the ground that the meaning of the term iron ore had been determined by the Supreme Court as ore in the crude or natural state, and it is a question of law for the court to pass upon, and is without the province of a jury. The motion was overruled. The defense was then opened by Mr. Carr, who tried to show that the commercial designation of iron ore is ore in its natural or crude state. William D. Rees, of Cleveland, Ohio, who is in a company who produce 225,000 tons yearly, testified to the same fact. Other witnesses for the defense were Joseph D. Weeks, David F. Houston, president of the Crozer Steel and Iron Works, R. F. Smith, James Pickands and Thomas Wilson.

Powell Stackhouse, vice-president of the Cambria Iron Company, said that the person had to take his chance as to the amount of moisture contained in the ores. In recent years, 1881 and 1882, allowance for moisture was made. The custom was in vogue in isolated cases before then, but did not become general until later years. Frank S. Witherbee, of Fort Henry, N. Y., who is with a firm second in the United States as a producer of iron ore, testified that the term iron ore means the ore with water both chemically and mechanically combined. If a pile of 900 tons was placed by the side of a pile of 1000 tons, and the smaller pile was made wet with rain, so that its weight increased to 1000 tons, the intrinsic value of the two piles would be same as before, and they would both be ore, although the water does not increase the metal. Louis E. Stanton, of Crocker Bros., of New York, corroborated the testimony of the water witnesses. The remaining witnesses that were called were George H. Ely, president of the Western Iron Ore Association; William D. Marvel, J. Wesley Pullman, Robert C. Thomas and John M. Hartman. The interest in the suit was very much restricted by the court practically ruling out testimony which referred exclusively to domestic ores. The salient points of the case were presented in writing both by the defendant and the plaintiffs, and in the charge to the jury the court gave written affirmations or objections to these various points, and then addressed the jury upon the testimony. Without going into the detail of the charge of the court, or attempting to touch upon the various points made, it is fair to assert that the principal issue which the jury had to decide was whether sufficient evidence had been presented to prove that the custom, even in handling foreign ores, is to sell them as ore dried at 212° F., or whether this provision was not expressly stipulated in all or many of the contracts which were made for dry ore. While the Government might have strengthened its case in several points, it was in the main well conducted, and notwithstanding the fact that the ruling above mentioned interfered somewhat with the plan laid out it was evident early in the trial that the plaintiffs would not be able to sustain their claim. It was no surprise, therefore, to find a verdict for the Government returned by the jury after they had been out for the hour which the court took for recess at noon.

Improved Bench Dog.

A new bench dog has been brought out by Larson & Frauman, of Anoka, Minn., who are the sole manufacturers. It is the invention of Frederic Larson, to whom letters patent have been issued covering its essential features. The accompanying cut illustrates the device and the method of its use. As shown here, a block is held in position by the dog, but it is intended to hold a board of any length, limited of course by the length of the bench. The illustration is slightly imperfect in representing an upward curve at the toothed end of the dog. As the device is now made, the dog lies flat, so that a very thin board can be held by it, even down to $\frac{3}{16}$-inch in thickness. It consists of a longitudinally reciprocating bar, provided with rack teeth on the side to engage with a toothed segmental lever, which is pivoted to the frame and cap-plate. A pawl is placed in front of the segmental lever to secure it in place, a stiff spring causing the pawl to operate automatically as the dog is tightened up to the board by the lever. The objects of the device are, to inclose, protect and guide the sliding dog by a frame extending substantially its whole length, and to afford facilities for securing the dog at both ends to the top of a bench. To fasten the dog to a bench, it is provided at each end with a downwardly projecting pin slightly inclined to the rear to enter holes which are bored in the top surface of the bench, 2½ inches apart. The dog is specially adapted to use in cabinet shops for hard wood when very thin material is being worked. It can also be used with advantage by gunsmiths to hold their guns in finishing. It is made of the best malleable cast iron, nickel plated, is 7 inches long, and weighs about 1 pound.



Improved Bench Dog, Made by Larson & Frauman, Anoka, Minn.

The Lake Fleet.—The magnitude of the commerce of the Northern lakes as described during the present season of navigation is the cause of wonderment. A Cleveland correspondent says: "On account of the very large increase in the tonnage on the lakes during the last few years it is impossible to give an exact statement of the amount of tonnage passing through the St. Clair Flats Canal and the Detroit River, but a fair estimate can be made. In 1887 there were built on the lakes 60 new vessels, all but two of them steamers. Their aggregate carrying capacity in gross tons was 108,525, and total cost $8,325,000. It is safe to say that the coming winter and spring will see that amount almost duplicated. Cleveland has at the present time a fleet of 229 vessels, with an aggregate registered gross tonnage of 155,188 tons, and a carrying capacity very nearly double those figures. Of these 111 are wooden steam vessels, 10 steel and iron vessels and 109 sail vessels. Detroit and Buffalo follow Cleveland very closely, their aggregate tonnage being not far from 300,000 tons. Chicago has about three-quarters as much as Cleveland, and other ports on the lakes nearly one and one-half times as much. This makes a total of 795,000 tons on the chain of lakes. This entire tonnage, loaded, makes on an average one trip a week through the St. Clair Flats Canal. By reckoning the lake season as 30 weeks, from the 1st of May to the 1st of December, the enormous total of 23,850,000 tons is given as the record of that little channel for one year. Beside these figures the Suez and all other canals fade into insignificance."

Some time ago we noticed the fact in these columns that the Pittsburgh suspension bridge, connecting the cities of Pittsburgh and Allegheny, was being tested, for the purpose of determining how the bridge has stood the test of wear since it was erected nearly 30 years ago The inspection was under the charge of William Hildebrand, an engineer of New York City. The inspection was completed on Friday, the 12th inst., and in his report of it to the board of directors of the bridge company Mr. Hildebrand states that the bridge is in as good condition at the present time as when it was finished in 1859, and that with proper precautions the structure will last for 100 years more in perfect security.

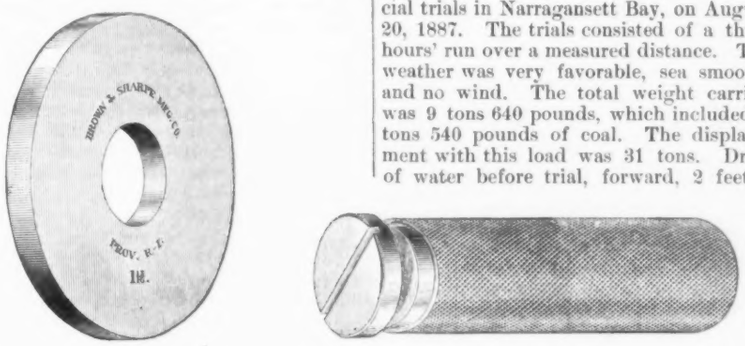
From the Marquette (Mich.) *Mining Journal* of the 29th ult., we take the following table showing the shipments by ports up to date this season, in comparison with shipments for the corresponding portion of the two preceding years:

Port.	1888.	1887.	1886.
Marquette.....	612,212	645,740	684,775
Escanaba	1,545,714	1,606,525	1,151,116
St. Ignace.....	91,311	73,253	55,347
Ashland, Wis..	822,501	866,203	542,340
Two Harbors, Minn.....	279,186	299,083	243,808
Total.....	3,350,924	3,490,804	2,677,386

Standard Reference Disks.

When a gauge or caliper has been long in use the question arises whether constant service has impaired its accuracy. In deciding this question the Standard Reference Disks, of which we annex engravings, are of use. They are also useful for other purposes, being excellent in most instances where there is need of referring to standards. In shape they are round, washer-like pieces, made of steel hardened and carefully ground. The edges are bright, the sides black—a good finish which does not rust.

The disks are used, frequently without handles, for setting calipers, testing measuring tools and determining sizes in shop practice. With handles, they are used as internal cylindrical gauges. They are designed, however, to serve principally as reference, not as working gauges. The diameter of each is stamped upon it in 16ths and also in decimals of an inch. A complete set consists of 45 disks and 6 handles, and is neatly arranged in a suitable box. The $\frac{1}{4}$-inch and $\frac{5}{16}$-inch disks are furnished with the handles attached. They are turned out by the Brown & Sharpe Mfg. Company, of Providence, R. I.



STANDARD REFERENCE DISKS, MADE BY THE BROWN & SHARPE MFG. CO., PROVIDENCE, R. I.

New Steel Guns.

The two cast-steel 6-inch guns which are to be submitted to the prescribed test for tensile strength and other qualities, and perhaps will contest the palm of superiority with the Government's built-up guns, are now practically complete, and will before long be forwarded to the proving ground at Annapolis. One is the gun made at Pittsburgh, and finished at the Washington factory. It was cast whole, and the operation was so completely successful that the company wished nothing better, as an example of its system, to be put in competition with built-up guns of the same caliber. The trimming and rough boring having been done at Pittsburgh, it was rifled, sighted and fitted with the breech-loading apparatus at the Navy gun factory. This gun is fully completed, but is perhaps waiting for its fellow competitor, the Thurlow open-hearth steel cast gun, which will be ready within a few weeks. This, also, after being cast and rough bored, was taken to the Government lathe for rifling and smoothing off.

There are also at the Washington factory between 30 and 40 of the standard built-up 6-inch guns, finished and ready to be sent to Annapolis. They will go all together, so that the proving ground will present a busy scene during the remainder of this year. Among them will be the battery of the Yorktown, which is to be the first finished of the new vessels built under Secretary Whitney's administration, and will be ready about the 1st of December. Last week her engines had a preliminary trial and worked well. Besides the new cast 6-inch guns, the big 10-inch guns attract great interest. One of these was sent to Annapolis for testing long ago, but the official trial awaits the manufacture of a powder of a specified character by the Messrs. Dupont. Two other 10-inch guns will soon be completed, so that the three of this caliber may be proved about the same time. The Miantonomoh, which will be the first of the double-turret monitors completed, is to carry four 10-inch guns, and from present appearances by the time her successors are completed their batteries will also be ready for them. The cost of a 6-inch gun weighing 11,000 pounds is about $7750; that of a 10-inch weighing 57,500 pounds is about $20,500.

Torpedo-Boats for the United States Navy.

In a recent number of *Naval Intelligence*, issued by the Bureau of Navigation of the Navy Department, we find it stated that the Stiletto had her final official trials in Narragansett Bay, on August 20, 1887. The trials consisted of a three hours' run over a measured distance. The weather was very favorable, sea smooth, and no wind. The total weight carried was 9 tons 640 pounds, which included 4 tons 540 pounds of coal. The displacement with this load was 31 tons. Draft of water before trial, forward, 2 feet 9 inches; aft, 2 feet 10 inches. After the trial the draft forward was 2 feet 7 inches, and aft, 2 feet 8 inches. The mean speed for the three hours' run was 18.22 knots. The vibration at high speed was moderate. A navy compass was quite steady wherever placed. The mean indicated horse-power developed by the engines was 359. The endurance with 5 tons of coal is computed at 507 miles at a speed of 11 knots. The Stiletto was bought by the United States Government for $25,000, and turned over to the Torpedo Station on May 28, 1888.

Messrs. Herreshoff, of Bristol, R. I., signed a contract, March 1, 1888, to build for the U. S. Navy a deep-sea twin-screw torpedo-boat, exclusive of torpedoes and their appendages, for $82,750, of the following dimensions: Length over all, 138 feet; length on deck, 134 feet; extreme breadth, 15 feet; extreme depth, keel to crown of deck amidships, 10 feet. The keel will be rocker-shaped, the draft aft 4 feet 8 inches. The displacement will be about 100 tons, and the horse-power is estimated at 1600. The engines are to be five-cylinder quadruple expansion, driving twin screws. The two boilers are to be of Herreshoff's latest design, and placed in separate compartments forward and abaft the engine-room. Eight bilge-ejectors will give a total discharge of 280 tons per hour. A steam steering engine will be fitted to work a balance rudder of large area. The engines and boilers will be protected by coal. The interior will be divided into 11 water-tight compartments and lighted by electricity. There will be two conning-towers, one forward and one aft, with a search-light on each The armament is to consist of two torpedo tubes, a torpedo gun aft, and three 37-pounder rapid-firing guns.

A weight of 15 tons is to be carried on trial, which will be a three hours' continuous run. If on a three hours' trial the mean speed of the boat exceeds 22 knots, a premium of $1500 will be paid, provided the boat is accepted by the Department, for each $\frac{1}{4}$ knot in excess of 23 knots, and $2000 for each $\frac{1}{4}$ knot in excess of 24 knots. If the speed of the three hours' trial calculated as aforesaid falls below 22 knots a penalty of $4000 will be exacted. If the speed on trial falls below 20 knots, the Department reserves the right to reject the boat. The contract calls for the completion of the boat in 15 months.

Elastic Traces.

Foreign papers have recently directed attention to experiments which have been made in lightening the work of animals in drawing heavy loads by the use of elastic traces. It appears that some time ago M. Celler, Chief Engineer of Roads and Bridges in France, expressed a doubt whether the traces of leather or rope, or the iron chains, by which horses pull their load, could not advantageously be replaced by more elastic appliances, which would diminish the effort needed at starting, to overcome the inertia of a heavy cart or omnibus. Every one has noticed that a dray-horse is often obliged to use all his weight and strength to start a vehicle which moves along easily enough when once set in motion, and it is quite conceivable that springs in the harness might make the work easier by distributing the movement of starting over a longer period of time. Acting on M. Celler's suggestion, the directors of the Eastern Railway of France began six years ago to harness all the horses employed in shifting freight cars at their Paris station with traces made of chains having a strong spiral spring inserted in them. A large number of horses is employed in this service at the station, and the effect of the change has been very satisfactory. A considerable gain has been made in the durability of the harness, and the regularity of the work, through the diminution of the number of chains broken in the service; while the horses have done their work better and with less fatigue. The blow of the collar on the shoulders at starting is far less violent, and less injurious to the animal than under the old system, and the horses, finding that a strong, continued pressure will effect as much as the jerk which was formerly necessary, seem to gain courage, and pull steadily and directly, instead of wasting their strength in ineffectual plunges. During the six years of trial the directors of the company have become so convinced of the superiority of the new mode of harnessing that it has been adopted in all portions of the vast network of lines under their control.

The Persian Minister at Washington expresses himself freely in regard to men and things in America. He says that if the present Minister to Teheran had been appointed five years ago there would have been a Persian representative in the United States much sooner, and 1000 Persians would have been doing business in this country. The Persian people number 10,000,000, and if a railroad should be built securing local advantages the population would be doubled by the return of subjects who have removed elsewhere. Thus far no concessions have been made to foreigners with this object. It is not impossible that before long the Shah may visit the United States, with whom he is desirous of cultivating friendly relations. Persians desire to see something of American manufactures, as there are many things they desire to introduce.

The Wenstrom Magnetic Separator.

At the New York Metallurgical Works, of E. N. Riotte, 104 and 106 Washington street, a Wenstrom magnetic separator is in operation, Messrs. Scranton & Cook being the agents. The Wenstrom separator has been in use for over four years at Dannemora and at a number of other mines in Sweden, and has therefore passed the experimental stage in which a number of similar machines now coming before the public are still lingering. It differs from them in that it is capable of taking ore in large sizes, so that it is possible to eliminate by concentration a good deal of waste rock without the expense of crushing it to a fine size. The machine has a stationary field magnet, A, Figs. 1 and 2, and an armature barrel, E, consisting of a number of soft iron bars, E E, separated from one another by a non-magnetic material—in this case strips of wood. The whole is bound together by non-magnetic end rings F. The bars E E are cut away alternately on the inside to make one bar project only toward the north poles of the magnet and the next only to the south poles, as is shown in Fig. 1 at E and by dotted lines. This gives each succeeding bar opposite magnetism. On each of the four sections of the magnet are wound 15 pounds of copper wire. An Edison dynamo furnishes a current of 10 ampères and 35 volts. The ore is fed to the barrel by means of a hopper, as shown in the engraving, the cylinder turning in the direction of the arrow in Fig. 2. The magnetic ore adheres to the bars of the barrel and is carried downward past the first delivery shute. Below the machine the bars, departing from the influence of the electro magnet, which is placed eccentrically, lose their power to hold the particles of magnetic iron ore and they drop off. The particles of rock in the ore, being non-magnetic, drop off from the barrel almost immediately and fall on the first shute shown in the engraving. It may be noted in passing that the dropping of ore on the barrel in the manner shown tends to lessen the power needed to make it rotate. It runs at a speed of about 30 revolutions, the power required being relatively small. The Wenstrom machine is made in three sizes, the one used in New York having a diameter of barrel of 20 inches and a width of 15 inches. It is rated at a capacity of 3 tons per hour and will take rock up to 1½ inches in size.

The machine is employed not alone for separating magnetic iron ore, but also for converter cinder, mixed machine-tool filings, droppings from cupolas and spent foundry sand and for shot at blast furnaces. It has been employed for such uses at a number of places in Sweden.

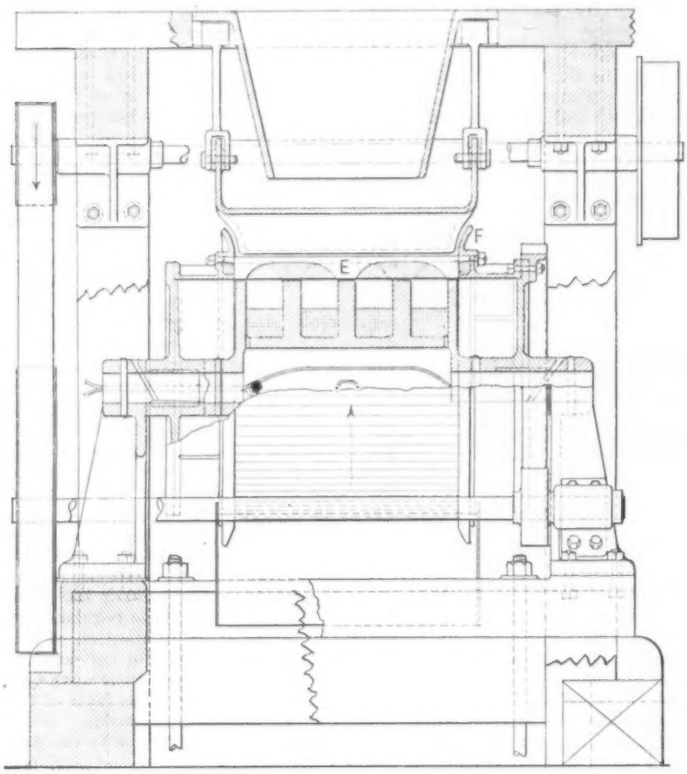


Fig. 1.—Longitudinal Section.

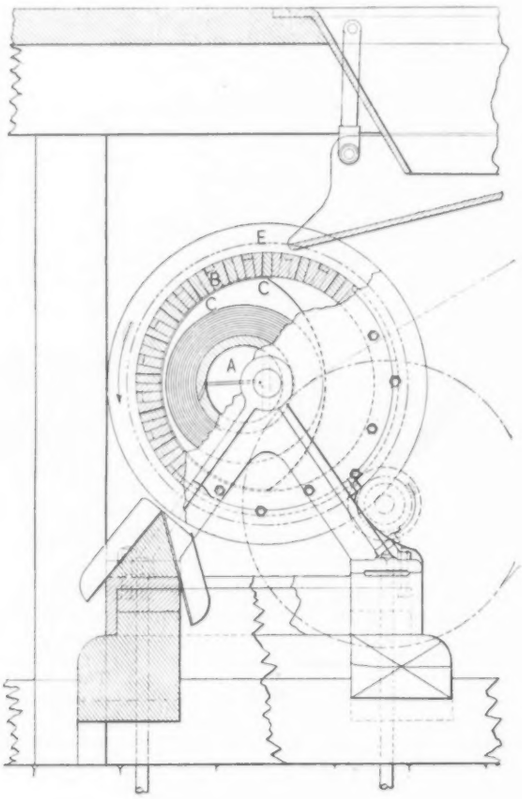


Fig. 2.—Cross Section.

THE WENSTROM MAGNETIC SEPARATOR.

The Effect of Iowa Freight Rates.

That the cry of distress which has been wrung from Iowa shippers is genuine is proved by the announcements now being made of intended removals of business establishments from the State. We are in receipt of the following letter on this subject from R. E. Sears, president of the Iowa Barb Steel Wire Company, of Marshalltown, Iowa, written under date of the 10th inst.:

"We have decided to move our machinery East, but have not decided on the location; will wait until after the election. Our reason for doing so is that the railroads have so arranged their freight rates that the discrimination against us places us at such a disadvantage that it is impossible for us to compete with those who are manufacturing at points east of Chicago. We have been hoping for relief, but now believe that the settlement of the suits with the railroads is so far in the future that we cannot afford to shut down and wait for their solution. If these discriminations are persisted in, I see no way open to other manufacturers and jobbers except to follow our example. I know of others contemplating the same move, but am not at liberty to give their names."

On the 9th inst., at Dubuque, Iowa, G. B. Mansfield, of the Westphal-Hinds Hardware Company, and other prominent business men of that city appeared before the Iowa Railroad Commissioners to show how seriously their business was being interfered with by the high rates imposed to Iowa points, being in some instances higher than from Chicago to the same points. One case might be mentioned. It was alleged that the rate to Mona on the Illinois Central was 22 cents from Dubuque, while from Chicago to Lyle, one mile north of Mona, the rate on the same road was 15 cents. The general manager of the railroad company, who was present, challenged the statement, but the production of freight bills caused him to withdraw his challenge.

The people of Iowa, who are endeavoring to build up manufacturing towns and trade centers in their State, are beset with serious troubles, and it will not be surprising if the example of the Iowa Barb Steel Wire Company has numerous followers.

The construction of a pipe line to convey natural gas to Wabash, Ind., from wells 14 miles distant, began on the 12th inst. Manufacturers are to be supplied at a nominal price and domestic consumers at a very low rate. Six-inch mains will be used. The line is to be perfectly laid and to be finished by the 1st of November.

Recent Legal Decisions.

TELEGRAPH COMPANY—ACTION BY SENDER OF MESSAGE AFTER PAYING DAMAGES.

W. C. S. & Co., brokers in Richmond, Va., wrote to P. at Charlotte, N. C., as follows: "If your customer will offer 100 shares (or any part of them) C. C. & A. R. R. stock at 43, delivered here, please wire us at our expense." Ten days later P. delivered a message to the Western Union Telegraph Company, addressed to W. C. S. & Co., which was as follows: "Party offers 100 shares C. C. & A. stock at forty-three. Answer quick." This message went delivered to W. C. S. & Co. with the price changed to "forty" by dropping negligently the word "three." Two hours after this telegram was transmitted, W. C. S. & Co. replied by wire: "Will take the hundred shares; draw at sight with stock attached." P. sent the stock and drew for $4300; W. C. S. & Co. refused to take the stock, and as they had sold it at 41¾, they had to buy it at that price to fill their contract, and they sued P. in a Virginia court and recovered their loss. P. gave the telegraph company notice of this suit that it might appear and defend it, but it took no notice of this alleged duty. P. paid the judgment and sued the company to recover the amount paid, but was defeated, and he carried the case—Pegram *vs.* Western Union Telegraph Company—to the Supreme Court of North Carolina, where the judgment was affirmed. Judge Morrison, in the opinion, said: "1. The plaintiff here, P., was not liable to W. C. S. & Co. for the loss suffered by them. They should have looked to the telegraph company. The message delivered to them was not P.'s message, and no contract was made by him through it. 2. Plaintiff cannot recover the amount paid by him in the action brought against him by W. C. S. & Co., for he was not liable to them, as we have stated; and there was no contract of agency between him and the company by which he can hold it responsible for the payment made by him. Not being liable to W. C. S. & Co., he cannot claim any indemnity from the company for his payment."

PREMIUMS OR GIFTS WITH SALES.

G. was convicted of selling food and giving away, as part of the transaction, a premium, in violation of the statute (Sec. 335 *a*, New York Penal Code), which provides a penalty against "any person who shall sell, exchange, or dispose of any article of food, or offer or attempt to do so, upon any representation, advertisement, notice, or inducement that anything other than what is specifically stated to be the subject of the sale or exchange is or is to be delivered or received, or in any way connected with or a part of the transaction, as a gift, prize, premium or reward to the purchaser." In this case—People *vs.* Gillson—on appeal, the Court of Appeals of New York, reversed the judgment. Judge Peckham, in the opinion, said: "Here the offense, as set out in the warrant, was the delivery of a tea-cup and saucer by the Great Atlantic and Pacific Tea Company, to one A., on a purchase by him of 2 pounds of coffee from it, the company having announced or advertised that such a gift would be made to a purchaser of 2 pounds of coffee. The defendant contends that the statute is void, as it interferes with his 'liberty' as secured to him by the constitution. 'Liberty,' in its broad sense, as understood in this country, means the right, not only of freedom from servitude, imprisonment or restraint, but the right of one to use his faculties in all lawful ways, to live and work where he will, to earn his livelihood in any lawful calling, and to pursue any lawful trade or avocation. It is quite clear that some or all of these fundamental and valuable rights are invaded, weakened, limited or destroyed by the legislation under consideration. It is, evidently, of that kind which has been so frequent of late—a kind which is meant to protect some class in the community against the fair, free and full competition of some other class; the members of the former class thinking it impossible to hold their own against such competition, and, therefore, flying to the legislature to secure some enactment which shall operate favorably to them, or unfavorably to their competitors, in the commercial, agricultural, manufacturing or producing fields. By the provisions of this act a man owning articles of food which he wishes to sell or dispose of is limited in his powers of sale and disposition. It is lawful to sell coffee, and the defendant here may be satisfied to take a less profit upon a single sale by making the gift, because he can thereby increase his sales and have a greater income by reason of a greater business at the end of the year. This statute, if valid, steps in to prevent his adopting such a course to procure trade, and from it to secure an income and livelihood for himself and his family. It is contended here that the statute should be upheld on the ground that its enactment is a proper exercise of the police power of the State: 1. Because the transaction is in the nature of a lottery, indeed, the statute is placed in the Penal Code under the head of 'lotteries.' 2. That the sale of impure, unwholesome and adulterated food is thereby hindered. We are of opinion, however, that the words of the statute cannot be construed to have been intended to defeat a lottery or to declare that the sale of bad food would thereby be interfered with. The conviction must be reversed, and the defendant discharged. All of my associates concur in this judgment."

BANKING—LETTER OF CREDIT.

A firm in New York requested a bank to open a telegraph credit on its account in Hong Hong, China, as follows: "Please telegraph authority to Vogel & Co., Hong Kong, to draw at 6 months for our account against consular invoice and full set bills of lading of 2000 bales manila hemp, p. Robinson, at the rate of 4 pounds p. bale, on a basis of 8 shillings sterling, freight filled up in bill of lading, reducing advance, if higher." This credit was wired, and a letter of credit was sent by the bank to Vogel & Co. next day for £10,000. Under the telegraphic authority Vogel & Co. made three drafts amounting to £8080, at six months, on account, as stated on the bills, of 2020 bales of hemp, and the drafts were accompanied with letters of advice, which informed the bank that they were drawn against these bales of manila hemp, which had been forwarded by the ship Robinson, as directed. The drafts had been accepted by the bank's agents in London, through whom the credit had been wired, before the ship arrived in New York. Instead of shipping 2020 bales of manila hemp but 500 bales were sent, the remaining bales containing rolls of matting. To each draft was attached a bill of lading for "bales of merchandise," "weight and contents unknown" and Vogel & Co., on each bill of lading, after the captain had signed them, and without his knowledge, indorsed an abstract of invoice for "bales of manila hemp." The bank paid the acceptances, but the firm refused to pay the bank, and an action was brought against it. Vogel & Co. had absconded. Judgment was given on a draft which covered the 500 bales of hemp, but denied for the balance, and the case—Bank of Montreal *vs.* Recknagel—was carried to the Court of Appeals of New York, where the judgment was affirmed. Judge Gray, in the opinion, said: "If Vogel & Co., in any material matter, failed to comply with the terms and conditions of the cable credit, the plaintiff's London agents accepted their drafts at their peril. Defendants cannot be held liable except upon actual consignments of manila hemp. The term "documents" in the cablegram clearly meant, in the minds of merchants and bankers, consular invoices and bills of lading. The difficulty has arisen here from the failure to specify in the bills of lading the kinds of merchandise which the defendants had authorized the plaintiffs to accept against them, and in the acceptance of drafts which were not against shipments of that kind of merchandise at all. Letters of credit are governed by the same legal principles as are all contracts. The credit here was authorized upon certain conditions prescribed by the parties to be ultimately bound, which they not only had the right to make, but which were assented to by the plaintiff. It is difficult to see how parties could more particularly define the terms of their engagements than was done in this case. It is urged that all commercial instruments are to be liberally interpreted, so as to protect persons who give credit on the faith of them. But that principle only applies where the provisions of an agreement are ambiguous, loose, or are susceptible of more than one interpretation, which is not the case here. The master of the ship should identify the goods for which he gives a bill of lading; that could have been done here; but whether it was done or not, this case cannot be controlled by it. The agreement between the parties was a definite one, and it must be enforced."

Refilling Collieries.

Among the economical inventions recently introduced at Shenandoah by the Reading Company is a device, at the Kohinoor Colliery, for refilling the excavations from which coal has been mined. The method of doing this is both simple and effective, and prevents the caving in of the earth above, and the consequent loss of valuable property, which has not been infrequent in the mining towns of the anthracite region. Besides, the valuable pillars of pure coal, which for many years it was customary to leave in the mines, to prevent falling in of the roof, can now be taken out without fear. A coal-dirt conveyer, consisting of a series of semi-circular shutes, similar to those used in discharging coal from carts into cellars, commonly used in this city, and an endless chain with scrapers attached automatically conveys the fine refuse from the coal breakers to an elevation, from whence it is discharged into a second shute. As the coal dirt falls on the second shute the water pumped from the interior of the mines mixes with it and carries the fine coal dirt, in a semi-liquid state, back through a jig or puddling hole into the bowels of the earth, from whence the coal has been removed. The coal dirt settles to the bottom of the breasts and packs closely, and the water seeks an outlet below, to be again pumped out to repeat its duty. The cost of thus puddling the refuse matter back into the mines, about 3 to 4 cents per cubic yard, is comparatively very small compared with the value of the pillars of marketable coal of which the mines may be safely "robbed," and the security obtained for dwellings and railroad property on the surface, above the mines. Already more than two acres beneath the city of Shenandoah, from which the coal had been mined, have been again solidly refilled with the coal dirt which used to be piled mountains high around the town.

The St. Louis Malleable Iron Works, at St. Louis, continue idle, and will probably not resume operations before next year.

THE WEEK.

Respecting the operation of the Interstate law, President Adams, of the Union Pacific Railroad, is quoted as saying that he thought the new statute is greatly responsible for the demoralization of railroad affairs, and experience has shown that it is not based upon sound principles. The inability of roads to make lower rates on traffic between large commercial centers and intermediate local points, he says, has the effect of driving the business away from large points, and the prohibition on pools is leading to a general consolidation of roads. The weaker lines, being unable to compete against the stronger lines on even terms, will be absorbed by them.

There are 427 miles of street sewers in New York City. The total revenue from the Croton water service for the quarter was $1,033,777.62.

Canada's commerce is severely crippled by an extensive wash-out on the Cornwall Canal, by which transportation seaward by water is summarily closed, and at a busy season of the year, when everything that could carry cargo was pressed into the service. Large quantities of grain were in transit, so that the forwarding companies suffer considerable losses.

Millions in the shape of rich gold-bearing quartz are visible at Douglass Island, in Alaska, where Senator Jones, of Nevada, has a great stamp mill of 240 stamps, rated as the largest of its kind in the world. A Sitka correspondent says this year the mill made further enlargements, until $500,000 has been invested in the plant. The company have acquired quartz ledges along the face of the mountain for a distance of 9000 feet alongside of deep water. The mill hugs the foot of the hill quite closely, and higher up, not more than 500 feet, is the foot of the quartz quarry. The excavation in the side of the mountain resembles a giant stone quarry from whose sides are blasted in the open air hundreds of tons of gold-bearing quartz rock for the use of the stamp mill. A tramway carries the quartz to the mill, where, with water and pounding machinery, it is reduced to powder and then borne to the chlorine works 400 or 500 yards away, where the impalpable and invisible gold is separated from the dross and dust. The amount of gold-bearing quartz exposed to sight at that one point alone is enough to keep the mill in operation for an indefinite number of years.

A frightful railroad disaster occurred at Mud Run, on the Lehigh Valley Railroad, caused by the engine of one train crashing through the rear cars of the preceding train, all of which were crowded with excursionists. At least 64 persons were killed outright, a large proportion of them young men and boys belonging in Pleasant Valley and neighborhood. It does not appear that the signals were properly managed.

There are at least a dozen steamships in the tropical fruit trade which ply between the island of Jamaica and ports in the United States. A few years ago the trade was confined almost exclusively to small sailing vessels delivering their cargoes in New York. Philadelphia and Baltimore now divide the business. The island of Jamaica is destined to become one of the great fruit gardens of the world. The exports of bananas last year comprised nearly 2,000,000 bunches, all to the United States. Exports of coffee anddyewoods likewise largely increased.

Pratt's Standard Oil Works in Williamsburg were burned on the 11th inst. The fire broke out in the hold of the oil steamer Hafis, lying at the dock, and quickly communicated to the buildings and tanks. The bark Ella Vose and the Philadelphia and Reading Elevator were also burned. The loss to the latter is $25,000; fully insured. The total loss is estimated at nearly $500,000. The estimates as far as made are: Storage building, $50,000; oil in barrels, $50,000; docks and bulkheads and pipes, $75,000; steamship Hafis, with cargo, $110,000; bark Ella Vose and cargo, $40,000; coal yards, $20,000; other vessels and lighters, $20,000; total, $365,000.

The importance of American trade with Cuba appears from the single fact that in September, out of a total of 75 vessels, measuring 85,241 tons, arriving at Havana during the month, 37 vessels, of 33,075 tons, were American. British vessels numbered only 5.

Out of 18 strikers who went out of a carpet factory in Astoria, last week, only three were American citizens. The weavers objected to an American citizen learning the trade.

Plans for the Merchants' bridge at St. Louis, one terminus of which will be at Venice, in Illinois, have been adopted. There will be three spans of about 600 feet each, and the structure will cost $1,500,000. The enterprise is a movement against Gould. The construction of the Union Railroad Bridge which the Wheeling and Harrisburg Railroad Company are building over the Ohio River at Wheeling has been begun. It will reach all the roads centering at Wheeling, West Va., and it is to be 3100 feet long. It will be finished in 1890.

Illinois farms are mortgaged to the extent of $142,000,000, and the total mortgages on lands, lots and chattels is $402,000,000.

The Turkish Government has decided to establish an arsenal, a dockyard and harbor works at Jeddah, and to station a flotilla for service on the Red Sea.

Proceedings having been commenced by the Attorney-General of this State to test the legality of the combination of sufiar refiners, the public are interested to learn the facts. The capital of the Sugar Trust is $50,000,000, and its profits have been so enormous that within the past year they have declared five dividends of 2 per cent. each, or a total of 10 per cent. on the capital. It was found, however, that with the whole number of factories, the amount of sugar produced was in excess of the supply, hence these factories were shut down by order of the Executive Committee of this sugar octopus and 1000 men were thrown out of employment. The value of the property originally put into the trust was from $15,000,000 to $20,000,000. It was capitalized for $45,000,000 and then increased to $50,000,000. The profits last year of 10 per cent. were declared upon this inflated capital. The original $20,000,000 represents the value of the property. The actual dividends upon this investment, therefore, are fully 25 per cent.

The Park Department in this city ask for $2,000,000 for the coming year to defray the cost of a tunnel under the Harlem River at Seventh avenue and 155th street.

It is announced that the Suburban Railroad, of this city, which now runs on Third avenue nearly to 167th street, will be extended to the Bronx River, bringing into market several hundred acres of elevated land commanding fine views of the East River and the Sound.

From Adelbert Hamilton's analysis of railroad indebtedness in the United States it appears that the aggregate is more than four times as great as our national debt, and is mainly payable within the next 25 years. The annual interest charges, which are of course paid by the traveling and shipping public through fares and freights, are equivalent to a tax of $3 per annum upon every individual in the United States; and this, it is to be remembered, is about one-half as great as the aggregate taxation by the Federal Government through tariff and internal revenue collections.

France follows India in offering large premiums for the invention of a machine for decorticating ramie fiber, which in gloss and luster approaches the finest silk and promises to become invaluable.

The Georgia School of Technology, the only technological school which is purely a State institution, was opened in Atlanta on the 5th inst., and transferred by the commissioner who had charge of its erection to the trustees of the State University, of which it is part. The school starts with about 100 students.

The Union Trust Company have bought the buildings Nos. 78 and 80 Broadway and 5 and 7 New street for $775,000.

Since the organization of the warehouse trust in Brooklyn and the advanced rates for wharfage and storage the bulk of the business on the water front has been transferred to Jersey City and Staten Island.

German troubles in East Africa are looked upon in England as masking a scheme for territorial acquisition.

The Treasury Department has decided that wire mattresses are not furniture within the meaning of the Tariff act, but are dutiable at the rate of 45 per cent. ad valorem as unenumerated manufactures of metal.

The value of the industrial products of Philadelphia increased between the years 1859 and 1860 from $63,784,212 to $152,355,318—a greater rate of increase than was ever made in an equal period before or since in the city's history.

A circular from the Marine Hospital service prescribes stringent regulations for the disinfection of all vessels which are liable to bring the germs of contagious disease.

The decision of the Supreme Court of Utah dissolving the corporation of the Mormon Church and forfeiting to the Government the estate of the Church, valued at more than $1,000,000, is a blow which foreshadows the disintegration of Mormon institutions.

The Senate confirmed the nomination of James P. Lesesne, of South Carolina, to be consul general at Melbourne.

Louisiana sugar manufacturers are said to have expended fully $1,000,000 within the past year for improved machinery. Each plantation of any size has its own sugar mill, in several instances at a cost of $40,000.

Rumor has it that the stern frames of the cruiser Baltimore are cracked as the result of faulty cooling. This is contradicted by the officials, who say that all that has gone wrong with the Baltimore is the breaking of one of the rudder clutches by the scow which ran into her recently, and that the damage can be repaired for $200.

Wm. B. Franklin, Commissioner-General, and Sommerville P. Tuck, Assistant Commissioner-General, for the United States to the forthcoming Paris Exposition, which opens next May, have been in Washington for the past several days conferring with the Secretary of State and other heads of departments respecting the Government exhibits at the exposition and details of the work devolving upon them. They report commendable progress in their preliminary work. Thousands of circulars have been distributed from their headquarters in New York city to manufacturers throughout the country, and to

leading men in all industries; and they are daily in receipt of applications for space at the expositson. These applications, the Commission announce, will not be acted on until about the 1st of December, in order that when all are in they may make an equable division of space among intending exhibitors.

The proposed Bay of Fundy ship railway canal has been put under contract. A dispatch from Ottawa says that T. C. Keefer, President of the American Society of Civil Engineers, has received a cablegram from London announcing that a contract for the construction of a ship railway from the Bay of Fundy to Baie Verte, Gulf of St. Lawrence, has been finally settled. Mr. Keefer is one of the provisional directors named in the act of Parliament incorporating the Chignicte Marine Railway Company. The works will probably cost $5,000,000.

The *Financial Chronicle* has the following estimate of wheat supply for the current year:

		Bushels.
Stock of last crop left over July 1, 1888		56,617,127
Crop estimate now made		411,000,000
Total supply		467,617,127
Consumption to July 1, 1889	286,110,000	
Needed for seed	35,000,000	
Export, say	100,000,000	421,110,000
Left over for stock		46,507,127

To last year's consumption should be added 2 per cent., about the rate of population increase, and to last year's figures for seed 1,000,000 bushels; still there remains 100,000,000 for export, with 46,500,000 left over for stock.

The new Mexican National Railroad has been completed, and the roadbed and bridges have been thoroughly tested. The formal opening of the road will not take place, however, until November 1. This new route to the capital at once gives importance to the City of San Antonio, which gains vastly as compared with the routes hitherto open via Eagle Pass and via El Paso.

Extensive orders for rolling stock for railroads have been placed lately in order to meet the pressing demand for transportation. Besides a large addition now making to the equipment of the Pennsylvania Railroad, the Central Railroad of New Jersey is arranging a contract for the construction of 30 new consolidation locomotives, with the Wootten fire-box, to burn anthracite buckwheat coal; 2000 40 and 50 ton cars have already been contracted for, of which 1500 are coal cars and 500 box freight cars, and in a few days an additional order for 30 fine passenger coaches will be awarded. The new cars will be built partly at Milton, Pa., and partly at a car works in the Lehigh Valley. McKee, Fuller & Co., at Fullerton, Pa., have secured a contract for building 2000 gondola cars for the Lehigh Valley Railroad, for which the Catasauqua Iron works is to supply the iron bars and other iron materials.

The whole of the new embankment of the Yellow River, begun last autumn, and carried on at a cost equal to over $9,000,000, has been swept away by the recent flood. Nearly 1000 laborers who were on the bank were drowned.

A dispatch from Albany, N. Y., says: "In the action of Edgar Bronk against the Albany Penitentiary Commissioners, to test the question by injunction as to whether the convict labor law applies to county penitentiaries, Justice Mayhem, of the Supreme Court, has handed down a decision which in effect holds that the law passed last July, in regard to the employment of convicts in the manufacture of articles used in the prisons and reformatories, does not apply to the penitentiaries, which are controlled by the authorities of the respective counties in which they are situated."

A syndicate of capitalists, at Buffalo, comprising John Kelderhouse, Thomas Maytham, M. M. Drake, Berriman Bros., H. G. Trout, James Gibson and others have closed a contract with the Union Dry-Dock Company for the construction of a steel steamer, capacity 2500 tons, to be out next spring. Keel 260 feet, beam 40 feet, hold 23 feet; fore and aft compound engine by Trout; two steel boilers by Lake Erie Works, which take an interest in the boat. Captain James Gibson of the Lackawanna will sail her. Cost, $160,000.

The Philadelphia Bridge Works have a contract for 5,000,000 pounds of beams, girders, &c., for the Jersey Central Railroad, to be used in the construction of its handsome new depot at Jersey City, and in the building of new bridges and replacing of old wooden or weak iron ones on the lines of the company.

The Maine shipping business is active. Quite a number of square-rigged vessels have sailed from Bangor to the Mediterranean with fruit boxes and others to Scotland with spool stock.

An island has suddenly risen 3½ feet above the surface of the water in the harbor of Vera Cruz. The city itself was recently visited by a cyclone, an earthquake and a water-spout.

Enormous quantities of iron tubing will be required within the next year or two to supply the demands of the telegraph and telephone companies, some of whom are now busily engaged in laying conduits for their underground wires. Already large orders have been placed for tubing for this purpose, which accounts for the present unusual activity of the pipe mills, and this has caused a big demand for skelp.

The powder works at Mountain View, in Passaic County, N. J., lately owned by the Laflin & Rand Powder Company, also those at Pompton, have passed into the control of the Standard Oil Company.

A special cable dispatch says: "Every detail of the Pacific Mail contract is now definitely settled between the Imperial Government and the Canadian Pacific Railway Company. The contract stipulates that the service shall commence in 18 months, the company receiving $225,000 annually from the Imperial Government, in addition to $75,000 from the Dominion, for a monthly service for ten years from Vancouver, not only to Yokohama and Hong Kong, as at first intended, but also calling at Shanghai. The whole efficiency of the Canadian route to the East now depends on the Atlantic service."

Dr. Warner, who lately erected the Seaside Institute for Working Girls, in Bridgeport, Conn., at a cost of $60,000, has just subscribed $20,000 for a building for the Young Men's Christian Association in that city, of which he is president. This is the outcome of a lecture delivered by Dr. Lucien C. Warner, of New York, the philanthropist who has just erected the library at Oberlin, Ohio, at a cost of $75,000.

The horse-car strike in Chicago has been ended by mutual concessions, but new difficulties threaten, on account of the retention in service of new men who volunteered to fill vacant positions.

There are now being shipped from Middletown, N. Y., a lot of the largest flagstones ever quarried in the United States. They are intended to form the sidewalk in front of Frederick Vanderbilt's new house on Fifth avenue, New York. There are 20 stones altogether, and each is 20 feet long, 10 to 15 feet in width and about 12 inches thick. It is estimated that the stones when laid down in the walk in New York will have cost $1000 apiece.

Bilbao, the great iron port of Spain, is being improved at a cost of 30,000,000 pesetas, and to reimburse the Government it is proposed to put an export duty of 25 centimes per ton on all minerals going out of the port.

The Soo Line, which has done so much to demoralize the railroad affairs of the Northwest, has given notice of an advance of rates from New York to St. Paul and Minneapolis, to go into effect on the 20th inst. The new rates will be as follows, with comparisons:

From New York, via the New York, Ontario and Western:

	Class 1	2	3	4	5	6
Present rates	$0.91	.75	.64	.46	.36	.29
New rates	1.00	.91	.71	.47	.40	.33

From New York via Canada Atlantic:

Present rates	$0.60	.50	.40	.30	.24	.20
New rates	.95	.88	.68	.44	.38	.31

Under the new rates it is thought Chicago will have no advantage, for the through rate from New York via that city to the Northwest will be 6 cents higher than the Soo rate on first-class freight, 2 cents higher on the third, fifth and sixth classes, and 4 cents higher on the fourth class.

The city of Newark has an estimated population now of 160,000. According to the census of 1880 it was then 136,508, and 29,983, or 61 per cent., of the inhabitants were engaged in manufacturing and mining.

Most of the lines of transportation in Florida and coastwise have resumed their freight service.

The canning industry of Maryland alone comprises 488 canning houses, with 25,000 employees, who receive over $10,500,000 in wages annually. About 22,000,000 cans are required to contain the oyster product, not to speak of the demands for packing fruits and vegetables.

At the American Institute Fair the machinery is in complete running order and the great Corliss engine is doing good work.

A very large factory for the manufacture of plate glass, the largest of its kind in the United States, has just commenced operations at Ford City, on the Lehigh Valley Railroad. The structure is 2000 feet long, with a galvanized iron roof and will contain six melting furnaces. The firm expect to make 20 plates of glass a day. In the grinding and polishing rooms are some massive machines, made on the grounds at the foundries and machine shops. They will use over 2000 tons of iron in their machinery. The polishing tables are to be run by a traction cable, working on the same principle as do the street railways. There are from 300 to 400 men employed now by the firm, and they expect when they are running in full blast to work about 1200. The furnaces, boilers, &c., are all heated by natural gas.

There is no cessation in the effort to introduce improved steam-heating processes on the various railroad lines. By January 1 the New York and New England line will have between 80 and 90 cars warmed by the New York Safety Car Heating and Lighting Company's system.

Harnessing the Niagara cataract is once more receiving attention in Buffalo, as the 582 inventors who have responded to the offer of a $100,000 prize for the best "harness" are becoming restless. Last week a committee of citizens appointed a committee to devise a plan of organization, in order that the necessary data may be prepared by competent hydraulic engineers to put the matter in shape for competition.

MANUFACTURING

Iron and Steel.

A new process in the manufacture of crucible cast steel, known as the Kingsland-Sinclair process, has recently been invented by Le Roy Kingsland, of Pittsburgh. An experimental lot of steel was recently made by this process at the steel plant of Howe, Brown & Co., Limited, in that city, which has been tested by the Motive Power Construction Department shops of the Pennsylvania Railroad Company, at Altoona, Pa., and also by Miller, Metcalf & Parkin, at Pittsburgh, giving satisfaction. The point claimed by the inventor for his process is that a crucible steel equal to the celebrated brands of Mushet steel can be produced for about one-fifth the cost of the above-named brand

The new plant of the Allegheny Bessemer Steel Company, at Duquesne, Pa., is rapidly nearing completion, and it is expected to be ready for operations by January 1. The Bessemer department is already finished, and filled with the most modern machinery. In the rail mill hydraulic working machinery will, in nearly every instance, take the place of roll-hands, furnacemen, shearsmen and hot-bed men.

M. V. Smith, of Pittsburgh, has received the appointment of consulting engineer to the Union Steel and Iron Company of St. Joseph, Mo., which has recently been organized.

Oliver Bros. & Phillips, of Pittsburgh, will commence work soon on the erection of a soaking pit furnace in their Thirteenth street steel works.

The car-wheel foundry mentioned some time since as projected at East Chicago, near Hammond, Ind., is now in course of construction. The principal owner is C. A. Treat, of the C A. Treat Mfg. Company, Hannibal, Mo. The new plant is to be of the most approved character. The buildings will be of brick, with iron roofs supported by steel trusses, and they will be equipped with hydraulic cranes, improved pits, &c. The capacity of the foundry will be from 200 to 250 wheels daily.

In the Pittsburgh papers recently was published a statement to the effect that the plate mill of Shoenberger & Co., of that city, had resumed operations after an idleness of six months. This statement is erroneou , as the plate and sheet mills of this firm have been in continuous operation for some months past with plenty of orders on hand. The firm have recently started up their nail plate train, on which tack plate is being rolled to be sold to outside concerns. The firm are not making any nail plate for their own use, as their nail factory has been closed down since July last and will be idle for an indefinite period.

The Clinton Rolling Mills, at Pittsburgh, formerly owned by Graff. Bennett & Co., and which have been idle since the assignment of that firm some months ago, have been put in operation by the syndicate of creditors who purchased the plant at the recent sale. A majority of the old employees were given positions in the works. Clinton Furnace, which supplies pig iron for the plant, is also being operated by the same syndicate, and is producing about 50 tons of pig iron per day.

Dilworth, Porter & Co., Limited, proprietors of the Glendon Rolling Mill, at Pittsburgh, started up their plant on Monday, the 13th inst., with non-union men. The firm manufactures railroad and boat spikes exclusively, and is the only firm in Pittsburgh employing workmen belonging to the Amalgamated Association that has not signed the Amalgamated scale, in consequence of which their works have been idle since July last. In order to fill their orders and retain their customers the firm have been purchasing spikes for some time from Richmond, Va. It is thought that the firm will have no trouble to secure a full complement of hands to operate the works

The Cambria Iron Company's new Bessemer steel works will be completed and ready for operation by January 1. They will have a capacity of from 1000 to 1500 tons per day.

W. D. Wood & Co., Limited, of Pittsburgh, manufacturers of the well-known patent planished sheet iron, whose works are located at McKeesport, Pa., are erecting a new office at that place, and when completed the present office of the firm, on Water street, Pittsburgh, will be abandoned.

We are informed that the report that the plant of the Elba Iron and Bolt Company, Limited, at Pittsburgh, would resume operations in a short time, is without foundation. The works have been idle since the assignment of the firm some months ago.

The nail factory of the Belmont Nail Company, at Wheeling, W. Va., which has been closed down for some time undergoing repairs, has resumed operations in all departments.

Florence Furnace, of the Henderson Iron Company, at Sharpsville, Pa., which was blown out last month for the purpose of relining and repairs, will resume operations again about November 1st next.

The American Wire Company, of Covington, Ky., are adding to their plant a Garrett rod mill of 100 tons capacity, and a wire mill of 75 tons capacity, double turn, to be in operation February 1.

For some weeks preparations have been under way for resumption of work at the Pottsville Iron and Steel Company's Fishback Steel Works. The fires were lighted on Monday morning after several months' idleness.

Negotiations are now pending for the transfer of the Marine Iron Works, of Bath, Me., to Gen T. W. Hyde. It is probable that the works will be started up without delay and run in conjunction with the Bath Iron Works.

From a recent issue of the *Age of Steel*, St. Louis, we take the following: "The Laclede Plate and Sheet Mill Company will likely go out of business as a distinct organization, having decided by vote to do so, we understand from a member of the company. The last of their manufactured stock at the Laclede Rolling Mills has been sold, and was shipped out last Saturday. But the impression prevails that Mr. Paddock, the president of the company, would be willing to lease and operate the Laclede property if it could be had on satisfactory terms. Meanwhile the mill is lying idle, owing to differences between the owners and the several parties negotiating for its use."

A Westmore furnace is being built at Hackettstown, N. J., on ground donated by the Warren Iron Company, to experiment with the reduction of zinc ores. This is to be followed by a furnace for producing iron direct from the ore

On the morning of the 7th inst. a gas explosion occurred at the Rosena Furnace, New Castle, owned by Oliver Bros. & Phillips, of Pittsburgh. The blast had been shut off from the stack for a few minutes, and the stopping of the air current caused a reaction which filled all the air-pipes with gas. This ignited and exploded. The air-pipes were shattered and the three blast engines badly damaged. An area of 2000 square feet was blown from the boiler house. Several workmen narrowly escaped death, but no one was injured. The loss is estimated at $8000.

Machinery.

The American Engine Company, of Cedar Rapids, Iowa, have consolidated with the American Nail Machine Company, of Findlay, Ohio, and formed a company with a capital stock of $250,000. The works being built by the latter company will be doubled in size, and in connection with nail machines the firm will manufacture high-speed engines from 100 to 300 horse-power.

The Beckett Foundry and Machine Company, Arlington, N. J., have succeeded the Beckett & McDowell Mfg. Company. The works, both foundry and machine shop, have been increased, and new tools added, so as to double their former capacity. They expect soon to begin the manufacture of Corliss engines.

The Jeffrey Mfg. Company, of Columbus, Ohio, manufacturers of the Legg Coal Mining Machines, report heavy shipments.

The Lincoln Iron Works, of Rutland, Vt., have just issued a new catalogue, illustrating and describing their various stone and marble working-machines and hoisting engines for quarries. The catalogue is very attractively arranged, and is in all respects a creditable specimen of trade publication.

D. B. Cruickshank, dealer in machinery, Providence, R. I., reports the following sales of machinery: A 150 horse-power Corliss engine to the Miller Soap Company, of Lancaster, Pa.; a double cylinder hoisting engine to the Pottsville Iron and Steel Company, of Pottsville, Pa.; a 20 horse-power boiler to C. H. Eglee, of Mystic, Conn.; a 6 horse-power engine and boiler to Daniel Howe & Hope, Rhode Island; a 10 horse-power boiler to Palmer & Goss, Fall River, Mass., and two boiler feed pumps to W. A. Harris's Engine Company, of Providence, R. I.

Davies & Thomas, founders and machinists, of Catasauqua, Pa., are engaged in the erection of a large addition to their foundry department. The new building will be frame, 40 x 190 feet in dimension, with corrugated roof, and is being erected adjacent to the present foundry. When completed, it will greatly increase the present capacity of the plant.

William Tod & Company, of Youngstown, Ohio, have under way rolling-mill engines for the Lake Erie Iron Company, of Cleveland, Ohio; the Harvey Steel Company, of Newark, N. J., and a pair of specially designed engines for the tire mill of the Latrobe Steel Company, of Latrobe, Pa., of about 1000 horse-power. They are also building some heavy rail straighteners, with engines attached, for the Johnson Steel Street Rail Company, of Johnstown, Pa.

Hardware.

The Union Indurated Fibre Company, New York, report a very satisfactory sale of their dry and liquid measures, which are referred to as having received the endorsement of the city sealers of weights and measures in New York.

Freeman Wire Company, St. Louis, Mo., are making some important improvements in their mills at St. Louis. The plain wire mill is being overhauled, so that its capacity will be increased to some 50 tons daily output, and a new Corliss engine of 250 horse-power is being put in with additional blocks for fine wires. The company are also building a new baker with

improved features, so that it is expected that one man will handle the same quantity of work as has heretofore required the services of three men. They are also putting ten new two-point machines in their barb plant, and are building an electric-light plant, which will light up both of their mills. The office and salesroom of the company have been moved to 410 North Main street, St. Louis, where they have just completed the putting in of some machinery for manufacturing bank, store and office fixtures, elevator inclosures, stable fixtures, window guards, iron crestings and iron and wire fences.

The Challenge Wind Mill and Feed Mill Company, of Batavia, Ill., are enjoying a heavy export trade, particularly to South America. They have recently taken large orders for the Argentine Republic, and are making shipments to Brazil via Rio Janeiro. Their home trade, which is their mainstay, is also reported to be in excellent shape.

Hussey, Binns & Co., Limited, shovel manufacturers, whose factory is on Twenty-seventh street, Pittsburgh, report a marked improvement in trade during the past few weeks. They are now engaged on a large order to be shipped to New Zealand, and the factory is running at full capacity. Not long since a large order was sent to Honolulu, and for years large shipments have been made to Australia.

Miscellaneous.

The Youngstown Car Mfg. Company, of Youngstown, Ohio, are filling a large order for cars for the H. C. Frick Coke Company, of Pittsburgh.

The Pennsylvania Railroad Company have placed orders for 1500 additional box cars. Seven hundred of the new cars are to be built at the company's shops at Altoona, and contracts for the construction of the remaining 800 have been divided between the following car works: Murray, Dougal & Co., Limited, Milton, Pa.; the Jackson & Woodin Mfg. Company, Berwick, Pa.; the Carlisle Mfg. Company, Carlisle, Pa.; the Lebanon Mfg. Company, Lebanon, Pa.; Pardee, Snyder & Co., Watsontown, Pa. The contract for this new equipment was divided on account of the immediate necessity for the use of the cars, and they will be built as quickly as possible. The orders for the iron materials to be used in their construction were placed almost as soon as the contracts were secured.

The following companies have been incorporated in Illinois: The Lansberg Brake Company, at Chicago; capital, $2,000,000; for the manufacture of air brakes; incorporators, Henry Heil, Frank Lansberg and G. W. Pfeiffer. The Sharpneck Journal Mfg. Company, at Chicago; capital, $1,200,000; for the manufacture of journal-boxes; incorporators, S. A. Stevens, Legrand Smith and Pliny B. Smith.

Fred. H. Holton & Co., of Cambridgeport, Mass., have built a copper rolling mill, which is now in operation. They will run it principally to supply their own wants. They use about $200,000 worth of sheet copper annually in the manufacture of bathtubs, copper boilers and sheet-metal work.

The Newburg Iron Ship Building Company have sold the entire plant of the company to the Chesapeake Dry Dock and Construction Company, of Newport News, Va. The machinery will be transferred as soon as practicable. The Chesapeake company have the largest dry dock in the United States.

Volume IX of the Transactions of the American Society of Mechanical Engineers has just been issued. It gives the full proceedings of the Philadelphia and Nashville meetings during the past year, and, like the preceding numbers, is full of information of the greatest interest and value to engineers generally.

Natural Gas in China.

Consul Denby sends to the State Department, from Peking, an abstract of an account given by Baron von Richtofen, of natural gas wells in China. These wells are found in Sz'chwan, near a town called Tsi-lin-tsing. In an area of 27 li (9 miles) diameter salt wells are found. To make a well the Chinese use a long and elastic bamboo pole, supported in the middle by a cross piece, a rope made by coupling the ends of long (not twisted) slices of bamboo, and an iron instrument which weighs 120 catties (catty = 1⅓ pounds). The rope is fastened on the thin end of the pole, and the iron on the end of the rope. A slight up and down motion of the thick end of the pole makes the iron hop and bore a vertical hole with its broad, sharpened edge. The ground to be perforated consists chiefly of sandstone and clay. When a portion of the rock is mashed, clear water is poured into the hole, a long bamboo tube with a valve in the bottom is lowered, and the turbid water raised to the top. Pipes of cypress wood are rammed in to protect the sides of the bored hole and to prevent the water contained in the surrounding ground from getting access to the well; the pipes are attached to each other at the ends with nails, hemp and tung oil. The inner width of the pipes is about 5 inches. As the work proceeds the pipes are rammed deeper, and a new one attached on the top; the rope, too, is made longer. At a depth varying from 70 to 100 chang (700 to 1000 feet) the brine is struck, and the well is fit for use. The brine is raised to the top through long bamboo tubes and bamboo ropes, as described, by means of a horse-whim, and then carried to large pans for evaporation, or led to them through bamboo pipes. Beside these wells there are others, which are bored to the depth of from 1800 to 2000 feet. At that distance below the surface petroleum is struck. Immediately on reaching it an inflammatory gas escapes with great violence. Work is now stopped, and a wooden cap fastened over the mouth of the pit, perforated by several rows of round holes. In each of them a bamboo pipe is inserted, and through these the gas is led under the evaporation pans. The pipes ramify, and on each end a tapering mouthpiece, terminating in a small aperture, is attached. The gas is then used for evaporating the brine.

The enterprising spirit which induced the Chinese to examine the ground at so great a depth is said to have had its origin in the drying up of a brine pit. The proprietor was in hopes of meeting brine at a greater depth, but found instead the gas. When the country was infested with rebels during the Taiping rebellion they removed the cap from one of the gas pits and set fire to it. Since that time, or at least up to the time that Baron Richtofen wrote, a long column of fire rose from that pit, and it is considered nearly impossible to stop the flame.

The gas pits and brine pits are owned separately by corporations. The owners are subjected to the control of the Government. The Government monopoly is in the hands of the "Taotai," who resides at the place. The salt works of Tsi-lin-tsing yield considerable revenue to the Government, and have, besides, enriched numerous proprietors, and given occupation to a numerous population. The number of "fire pits" is 24, and the salt pits are innumerable. Some of them do not enjoy the advantages of gas. The brine is evaporated with grass and wood. There are salt pits in neighboring localities on the Min River, but no gas pits.

History of the Gas Engine.

Sir Frederick Bramwell, in his recent address before the British Association for the Advancement of Science, remarked:

The gas engine is no new thing. As long ago as 1807 a M. de Rivas proposed its use for driving a carriage on ordinary roads. For anything I know, he may not have been the first proposer. It need hardly be said that in those days he had no illuminating gas to resort to, and he proposed to employ hydrogen. A few years later a writer in *Nicholson's Journal*, in an article on "Flying Machines," having given the correct statement that all that is needed to make a successful machine of this description is to find a sufficiently light motor, suggests that the direction in which this may be sought is the employment of illuminating gas, to operate by its explosion on the piston of an engine. The idea of the gas engine was revived, and formed the subject of a patent by Barnett in the year 1838. It is true this gentleman did not know very much about the subject, and that he suggested many things which, if carried out, would have resulted in the production of an engine which could not have worked; but he had an alternative proposition which would have worked. Again, in the year 1861, the matter was revived by Lenoir, and in the year 1865 by Hugon, both French inventors. Their engines obtained some considerable amount of success and notoriety, and many of them were made and used; but in the majority of cases they were discarded as wasteful and uncertain. The Institution of Civil Engineers, for example, erected a Lenoir in the year 1868, to work the ventilating fan, but after a short time they were compelled to abandon it and to substitute a hydraulic engine.

A Peculiar Industry.—Under the above head, a current paragraph gives the following particulars of the product of the castor bean: "The oil is specially adapted for lubricating all sorts of machinery, clocks, watches, &c.; and it is an excellent lamp oil, giving a white light far superior to that of mineral oils, petroleum, rapeseed, linseed and all other oils, whether vegetable, animal or mineral; it also gives very little soot, and, all things considered, has been pronounced the cheapest oil known. All the great perfumers of London and Paris use castor oil for the manufacture of golden oil, so well known for its property of keeping the head cool, and the skin and its pores, as well as the roots of the hair, soft and open. The oil is used for textile fabrics, to fit them for dyeing or printing, for which purpose the India dyers and printers invariably employ it; and it is one of the best oils for dressing tanned hides and skins of all kinds, on account of its imparting to them such a degree of strength, durability, tenacity and beauty. From the oil cake, in addition to its other uses, a gas is obtained, which gives a superior light, some of the stations on the East India Railway being illuminated in this way. The oil dissolves completely in alcohol, and this, incorporated with a solution of copal, makes a varnish which, it is said, is very useful in polishing all kinds of first-class furniture, carriages, picture frames, cloths, canvas, &c.

A branch railroad has been completed from the Milwaukee and Northern Railroad to the iron-ore mines of the Groveland Iron Mining Company, on the Menominee range, Michigan, and the shipments of ore to blast furnaces began last week. The company will mine Bessemer ores.

The Iron Age

New York, Thursday, October 18, 1888.

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The Steel Rail Trust.

The persistency of error and misrepresentation, not to use a stronger term, is strikingly illustrated by the frequent repetition of Mr. Scott's alleged figures of cost of steel rails at the Edgar Thomson works. We have shown their shortcomings in the past and have published the correct data, which were given out through Mr. Randall, but the numerous letters which have reached us since then prove that the latter have been overlooked, and emphasize the necessity of placing both side by side, although the items are not strictly comparable.

	Scott's estimate.	True cost
Pig iron	$21.08	$19.83
Spiegeleisen and ferromanganese	omitted.	3.24
Labor	4.09	4.32
Ingot molds, fire-brick, fire-clay, coke, oil, maintenance	not stated.	3.20
1.2 tons Connellsville coke at $1.35	1.62	...
Total	$26.79	$30.59
Deduct 285 lbs. steel scrap	....	2.18
Total	$26 79	$28.41

The Scott estimate took Bessemer pig at $18, and added 13 per cent. waste from first to last on $26, making it $3.08. The actual cost figures were based on $17 for Bessemer pig, allowing a yield of 85.8 per cent., and making a deduction for steel scrap. Mr. Scott made the stupendous blunder of assuming that it required 1.2 tons of Connellsville coke to produce a ton of rails at Edgar Thomson. Now, that establishment employs the direct process—in other words, the pig iron is taken direct in a molten condition from the blast furnaces to the Bessemer converters. No coke is used for remelting, except, possibly, in the case of accident, and for remelting the spiegel. The omission by Mr. Scott of the latter item is another astonishing error, to which must be added the neglect to provide for such sources of expenditure like molds, fire-brick, clay, &c.

To any one familiar with the manufacture of steel rails Mr. Scott's cost figures are ridiculously absurd on their face. Then it must be considered, too, that the Edgar Thomson Works are especially favored because they can use natural gas for raising steam and reheating, and because they are undoubtedly one of the best equipped works mechanically. It should be stated, too, that the cost figures give makers no allowance for the loss of revenue due to the production of seconds. It may be urged, on the other hand, that it does not cost the Edgar Thomson Steel Works $17 to produce a ton of pig iron. Probably it does not, but the furnace plant is an independent department and charges the steel works with the market price.

Now, when it is considered that the Edgar Thomson steel plant ranks as one of the latest among the most efficient works of the world, and that even for it prices are now down to cost, the wildness of the statements concerning the alleged steel-rail trust is clearly demonstrated. We have fully and frankly reported the facts concerning the Steel Rail Association. There may have been some among the manufacturers even who once attributed the rise following its creation to its existence. The different members of the association have had a very different conception of its aims and its power. Some have hoped and have urged that it be used to exercise a direct influence upon prices. Others have treated it as a means of impressing buyers with a show of power which it did not confer. Some have ostentatiously proclaimed their obedience to the dictates of the Board of Control in the matter of allotment; others have quietly sold all the rails they could get orders for with little reference to what had been assigned to them.

From his standpoint a railmaker who cannot crowd his cost below $32 at mill may well bitterly ask what good there is in an association which cannot, or will not, stop prices from dropping to $28 or less. When the demand in 1887 was heavy enough to give full employment not only to every mill in the association but to outsiders rolling from domestic or imported blooms, then prices rose to a level remunerative to all. When the inquiry dropped off values fell, so that a number of mills had to stop temporarily or entirely. Would a well-managed trust allow competition to degenerate in such a way, if it had the power to hold the price, even at the cost of paying a bonus to the weaker concerns? If the "trust" were as despotic as it is made to appear, would there be any sense in letting prices fall anywhere from $5 to $12 a ton below the cost of importing foreign rails? If the association criminally ran up prices to $40, was it not stupidly generous, from the standpoint of the stockholders in the mills, in letting them drop off to $28?

The rise went beyond the limits which some of the mills desired it to reach. We are informed that one of the makers proposed to the others to set aside a certain proportion of the product to keep English rails out of the Southwest and the Pacific Coast. It could not be done. The association was as powerless to control the advance as it was unable to check the decline. With all the alleged "trust" there is as much keen rivalry and sharp competition as there is among newspapers.

It may be urged that if our statement of the effect of the existence of the association is correct, it is a useless institution which the rail-makers might as well abandon. Yet they believe that it has done them some good. It collects monthly reports of sales and of shipments which are valuable to the majority of the mills. It has afforded the opportunity for at least one general meeting annually, at which the situation of the trade is discussed. It has afforded opportunities for mutual explanations and an interchange of ideas, the value of which business men in many lines of industry are more and more appreciating. We do not wish to be understood as denying that, early in the history of the association, hopes of a greater field of usefulness were entertained, probably, by the majority. Such illusions have been dispelled by the decline, but they do explain the apparently contradictory character of the reports during its history.

The Charcoal Furnaces October 1st.

A delay natural with so scattered an industry as the charcoal-iron manufacture made it impossible to present a report relating to them with the figures presented in our last issue. As will be observed from the details printed below, the charcoal furnaces are participating in the movement, now becoming so general, toward a larger output. Reports from a number of our correspondents show an active demand and a drawing upon accumulated stocks.

Charcoal Furnaces in Blast October 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England	14	8	605	6	495
New York	10	3	391	7	580
Pennsylvania	23	4	350	19	724
Maryland	13	3	271	10	570
Virginia	23	6	231	17	710
West Virginia	3	0	0	3	165
Ohio	18	8	560	10	695
Kentucky	3	3	270	0	0
North Carolina	2	1	90	1	80
Tennessee	9	5	1,030	4	980
Georgia	2	0	0	2	114
Alabama	10	8	1,531	2	370
Michigan	25	13	3,631	12	2,110
Minnesota	1	0	0	1	190
Missouri	4	2	595	2	320
Wisconsin	11	4	1,206	7	770
Texas	1	1	178	0	0
California	1	0	0	1	230
Washington Ter	1	1	330	0	0
Oregon	1	1	270	0	0
Total Oct. 1	175	71	11,619	104	9,083
Total Sept. 1	176	67	11,243	109	10,004
Total Aug. 1	176	65	11,137	111	10,095

In New York Chatham blew in in September, and Copake is probably at work at this writing. In Maryland two Stickney and one of the Maryland furnaces are producing iron. In Virginia Beverly, Cave Hill, Pierce, Reed Island, Speedwell and Walton made together 989 tons of iron in September. In Michigan reports from every active furnace show a total output of 16,171 gross tons for last month, Spring Lake having been added to the list; Detroit has followed since, and Elk Rapids is to blow in this month. In Wisconsin Hinkle, Florence, Minneapolis and National produced together 5571 tons; Missouri with two furnaces in blast made 2350 tons; Tennessee, with five stacks, 5195 tons, and Alabama, with eight furnaces, produced 6561 tons. Bear Spring is now being run in Tennessee to work up an old stock of coal, and will make 1400 or 1500 tons of warm blast car-wheel metal. The Nashville furnace is running on coke. In Alabama Ironaton is out; Round Mountain product was reduced by labor troubles, and one Woodstock was out two weeks repairing. The tendency is toward a larger output of charcoal iron.

A Chicago pig iron manufacturer informs us that while he agrees with the statements of fact set forth in our article of last week on the Chicago coke pig iron trade, he desires to lay particular stress on the increase in productive capacity in the blast furnaces in that locality, which enables them to fully supply the local demand and will probably allow for some growth in it. He calls attention to the fact that not only are blast furnaces now in operation which formerly stood idle for months and even years, but those in course of repair are being equipped with new hot-blast stoves and other appliances intended to largely add to their output when they

are again blown in. The hold on the home trade, which has for the first time been thoroughly established this year, the home manufacturers expect to maintain, the conditions now being deemed permanently favorable for the assemblage of raw materials at Chicago at sufficiently low cost to meet the competition of manufacturers in other sections. By the control of the home trade the entire exclusion of other irons is not meant, because consumers of pig iron often have preferences for brands which they will not relinquish until there is a decided difference in price. But the general consumers, who buy at the lowest price, quality considered, are those whose trade is secured, and they are the mainstay of the market.

Steel Makers in a False Position.

Sensational disclosures have been made in a bill filed in the United States Circuit Court at Chicago by the Atkinson Car Spring Works, of that city. An injunction is asked against the American Railway Spring Company, the American Steel Association and Park, Bro. & Co., Limited, to restrain them from making unjust discriminations against the complainants to ruin their business. The statement is made that in 1887 the American Railway Spring-Makers' Association was formed to protect the interests of the manufacturers and to regulate the price of car springs. The Atkinson Car Spring Works joined this association. In March of the present year the members of the association organized a trust called the American Railway Spring Company, in which each spring manufacturer was awarded stock. Allotments of business were made according to the capacity of the several works, and out of the sales they were to pay 2 per cent. to the trust. If the business done by a member exceeded the amount he was allotted he was obliged to pay the trust 15 per cent. of such sales. A fund was thus to be created, out of which the expenses of the trust were to be paid, and a part of it was to be divided among the members whose sales should fall short of their allotment.

When the Atkinson Car Spring Works applied for membership in the trust they were allotted less than half their capacity. In the ordinary course of business, this would have compelled them to pay the trust a tax of 15 per cent. on the greater portion of their sales. A further condition of admission to membership sought to be imposed was that the applicants should exhibit to the secretary of the trust all of their contracts. They refused to make this disclosure as to their private business, and demanded a larger allotment, the result of which was that they did not join the trust. They allege in their bill that the trust, in order to drive them out of business and control the car-spring trade, set aside a fund to be used against them, so that when the Atkinson Car Spring Works made a bid on a spring contract a member of the trust would bid below cost and take the business, being reimbursed for his loss out of the fund.

Now comes the part enacted by the steel manufacturers who supply the steel to the spring-makers. It is claimed that the spring trust made an arrangement with the American Steel Association, which is composed largely of the manufacturers of spring steel, to have the Atkinson Car Spring Works charged $10 per ton more for steel than the members of the trust. The American Steel Association is not a trust, but merely a trade organization, yet its members seem to have acquiesced in the wishes of the spring trust and to have taken action binding themselves to sustain it. The Atkinson Car Spring Works purchased steel of Park, Bro. & Co., and were charged $10 per ton more than their competitors, who are members of the spring trust. Notes were given in payment for the steel, and the court is now asked to restrain Park, Bro. & Co. from collecting more than its market value, as well as to enjoin the trust from its objectionable practices in attempting to destroy the business of the complainants.

At first blush it seems almost incomprehensible that the manufacturers of steel would lend themselves to such an outrage as the car-spring trust has sought to perpetrate, and we do not believe they were fully conversant with the facts in the case at the time when they agreed to charge independent spring manufacturers $10 per ton more than the members of the spring trust. The steel manufacturers should at once repudiate such an agreement, which is now made odious by the knowledge that it was to be used as a most powerful influence in destroying opposition to the spring trust. While the members of the trust were willing, wherever they could make a competing bid, to furnish springs below cost to keep the Atkinson Car Spring Works from securing business there was still a little chance of the latter keeping alive on work quietly obtained, but that chance was obliterated when the price of steel was so arbitrarily advanced.

It should be mentioned in justice to all interests that besides the Atkinson Car Spring Works another firm of spring manufacturers have steadily refused to join the trust. This firm is Miller, Metcalf & Parkin, of Pittsburgh. The peculiar tactics of the trust could not be used against them, however, as they manufacture their own steel.

A movement is on foot which is receiving considerable encouragement, to hold a meeting of American engineering societies abroad next year. The civil engineers, the mining engineers and the mechanical engineers have been approached and it is likely that after the ground has been sounded the enterprise will come up officially before the societies. We understand that there is a prospect of a cordial reception, providing for a week's stay at London, then a chance to attend the Paris meeting of the Iron and Steel Institute, and a week later a joint meeting of the English, French and American mechanical societies. The opportunities afforded for visiting the Paris Exhibition under peculiarly favorable auspices would probably not be lost sight of as an additional attraction. We understand that one of the steamship companies will undertake to run an extra steamer for the outward trip at special rates, providing the number of participants is over 150, the engineers being given the privilege to use their tickets for the return at any time during three months.

The Frauds at the Washington and Croton Aqueducts.

It is not surprising that irregularities, to use a mild expression, have been detected in the execution of the contracts for the two new great aqueducts which are to furnish water to the cities of New York and Washington. The term public works has become so nearly synonymous with corruption and fraud that the revelations, in connection with the Croton aqueduct at least, were almost expected, notwithstanding the fact that some attention had been given to the organization of what ought to have been an efficient staff of inspectors. We give to the Croton aqueduct the distinction of being the more likely of the two to warrant suspicion of fraudulent performances, mainly because of its New York connection, which speaks volumes for itself and which stamps nearly every public undertaking as a source of illegitimate profits to those immediately connected with its practical execution. Besides this, the Washington work was in the hands of Government engineers, of whom it was only natural to suppose that they would discharge their duties most conscientiously.

Details of the scandals which have lately been unearthed show that the shortcomings in the work are about the same in both cases, the lining of the tunnels and its backing being defective to a degree which almost surpasses belief. In the Croton aqueduct the most common form of bad work was in the backing, which, in a large number of places, consisted of dry stone packing, dumped in promiscuously and which consequently had open spaces of varying dimensions, according to the size of the stone used. Then, again, it was found that no attempt whatever had been made to fill long stretches over the arch of the lining. One particular hole was about 50 feet long on the axis of the tunnel and limited only at the ends by the roof coming too low down to permit further progress. A favorite material for filling some of the spaces appears to have been found in the empty cement barrels, over 800 of which were discovered on one division alone stowed away where there should have been solid rubble masonry. All this filling, however, as well as the empty spaces, was estimated and paid for as so much masonry at $6 per cubic yard. The profitable character of this work to the contractors requires no comment. Of the lining itself only the first or sometimes the second ring was properly laid, many of the bricks in the others being readily removed by hand.

In the Washington aqueduct a large part of the lining is reported worse than useless, and will be pulled down and rebuilt. The backing also has been found conspicuously absent in many places, and in others consists of loose stone tumbled in without cement, the whole paid for, as in the New York work, as solid masonry. The War Department, we understand, has referred the whole matter to Major Lydecker, the engineer of the Department, for investigation and report. The responsibility in both cases can, we think, be fixed with very little difficulty. While all directly connected must bear a portion of the blame, the principal burden falls upon the engineers and contractors who were primarily charged with the faithful supervision and execution of the work.

The Light Sheet Iron Trade.

In some portions of the country, particularly in the West, a positive famine has been raging in light sheets. For weeks the demand has been so great that no stocks can be accumulated in the hands of the leading distributors at trade centers to meet the demands of the small consumers. Orders are booked in advance of receipts, which keep the stock moving from the receiving department to the shipping-room. The mills are being pressed for deliveries in advance of dates agreed upon when contracts were made, but they so anticipated their entire output that they have allowed no margin for such a condition of affairs. The work they now have in hand will keep them busy much beyond the usual active season, while some manufacturers believe they will be able to run full time until next summer.

Allusion has been made in our market reports to some of the causes of this activity in light sheets. One of the main reasons assigned, and probably the only one which has been far-reaching in its influence, is the rapid growth of the iron roofing trade. While this branch of business has shown a steady advance for years past, it has made remarkable progress this season. Careful observers estimate the consumption of sheet iron for roofing, siding, ceilings, shutters, &c., in 1888 at fully 25 per cent. above that of 1887. Numerous establishments are working up 33⅓ per cent. more sheet iron this year than last, some have made gains of 50 per cent., and it is stated that one concern will probably reach 60 per cent. A large part of the increased use of iron roofing has taken place in the East, whereas in previous years the West was peculiarly the home of iron roofers. This is explained by the growing favor with which iron roofing and siding are being received by owners of manufacturing establishments. Corrugated iron buildings are being erected instead of more expensive brick and stone structures. Increased room for warehousing goods is thus obtained at lower cost and with fully as great protection from fires originating outside as though brick and stone were used. Sheds, stables, depot sheds, awnings for stores and a variety of other uses in the same line calling for light and strong roofing have stimulated the consumption of sheet iron most remarkably. More iron than ever before is going into shutters, doors and other methods of protection against fire, while sheet-iron ceilings are steadily growing in favor for decorative purposes. The galvanized-iron cornice-makers constitute in themselves an important subdivision of the roofing trade, and they consume an increasing portion of the output of the sheet mills.

The gauges of sheet iron used for roofing run from No. 24 to No. 27, a favorite thickness being No. 26. These numbers being in greatest demand by the stove and stovepipe makers and manufacturers of kitchen utensils, the competition for stock between them and the roofers will be readily understood. In making shed roofs of corrugated galvanized iron heavier gauges are used, running down to No. 22. In such cases the joints are soldered instead of being standing-seamed, roofers finding iron heavier than No. 24 too stiff to make a good joint of the latter character. The demand for light sheets growing out of the great development of the iron-roofing trade will keep up well into the winter, and promises to be renewed with even greater vigor next spring if the present prosperity of the country continues. This will be very satisfactory to the manufacturers of sheet iron who will find the demand for their product assuming more of a perennial character, although it must be admitted that this change has been gradually taking place in the past year or two. It is not a sudden development, but its effects on the trade were not marked until they produced the scarcity of stock which is now being felt. An obvious lesson to be learned from the experience of this fall is, that the general distributing and consuming trade must hereafter get their orders in early if they would have plain sailing in their busy season.

The Position of Tin Plates.

Since we last wrote editorially on the position of tin plates, two months ago, the New York market has been very active; the demand for canning purposes during the interval having proved all that was expected, especially for coke tin, which for a time could not be procured in amounts sufficient to cover requirements, and while this was the case temporarily advanced considerably. Now that the most active season is over, there is a lull; besides, the productive capacity of Wales is now evidently gaining on consumption, hence the partial reaction here coincides with receding prices on the other side. As tin plates are, however, comparatively cheap at current rates, it is not believed that there is much chance of a further decline, if any. This country has absorbed the largely increased importations with such remarkable ease that confidence in the future of the article has been greatly strengthened

The import into the United States during the first eight months has been as follows:

Imports of Tin Plates.

	1888. Pounds.	1887. Pounds.
Imports	455,109,658	431,228,621
Re-export	664,596	1,009,661
Net import	454,445,062	430,218,960
Import gross tons	202,877	192,062

The increase amounts to 10,815 tons, or nearly 6 per cent. The English Board of Trade returns for tin plates for the first eight months show the following amounts and distribution:

	1886. Tons.	1887. Tons.	1888. Tons.
To France	2,912	3,572	3,148
the United States	186,460	179,296	196,388
Canada	9,245	13,339	14,209
Australia	2,558	3,902	5,523
Other countries	31,563	35,702	44,294
Totals	232,738	235,901	263,562

If we except France, there is an increase in all directions.

The average price of coke tin has been:

1886.	1887.	1888.
13/2½	12/10	13/6¼

If the advance in tin since June had been reflected in the price of plates to a much greater extent than has been the case, it is doubtful whether such large amounts of the latter could have been pushed off.

In September, prior to the present reaction, the demand continued in England on a large scale. Makers were at the time so well supplied with orders that for the moment they seem to have felt quite independent, basing their arguments on the fact of iron being firmer and an advance in steel bars being contemplated, coal had advanced in price, and tin was again dearer, stocks of tin plates besides showing a decrease for the month of 36,000 boxes. As we approach the duller winter months, a pause in the more active demand for plates may be somewhat prolonged. Still they may prove good property to hold in view of the moderate ruling figures, and the encouraging general business prospects for the coming spring. The general impression is that next year, unless something unforeseen of an unfavorable kind happens, will be prosperous, all elements underlying the general situation pointing that way. A better insight in this respect will be afforded us after the elections, when a new leaf may be turned with greater safety. Meanwhile tin plates, in common with most other commodities not swayed by purely speculative influences, will have to pass through a short period of quietness.

OBITUARY.

ABRAHAM K. LISSBERGER.

Abraham K. Lissberger, aged 57, who was for many years a manufacturer of lead pipe in Boston and this city, died on the 11th inst. at a private hotel at Sixty-third street and Lexington avenue. He spent the greater part of his life in Boston, and in 1880 came to this city and until about a year ago was a general metal manufacturer at No. 256 Pearl street. At that time he became a sufferer from rheumatism and Bright's disease. Relinquishing all business pursuits, he went to Mount Pleasant, Mich., and afterward to Bedford Springs, Pa., with the hope of obtaining some relief. Believing himself to be materially improved in health, he returned to this city in September. A relapse ensued, and he grew steadily worse until the time of his death. Mr. Lissberger leaves a wife and three daughters.

The pioneer steamer of a new Canadian line of steamers, to trade between Charlottetown, Halifax and Boston, was completed a short time ago on the Clyde, Scotland. The Halifax, the name by which the vessel is known, is 250 x 35 x 23 feet, molded, with a tonnage of about 1600 tons. The engines of the vessel are of the triple-expansion type, the cylinders being 30 inches, 48 inches and 73 inches in diameter, with a 48-inch stroke of piston. The indicated horse-power is 3000. Steam is supplied by two steel boilers 14 feet in diameter by 17 feet 3 inches long. The grate surface is 246 square feet and the heating surface 6054 square feet. boilers worked on trial at a pressure of 160 pounds per square inch, and the engines developed 3100 horse-power. The vessel, when tried on the measured mile, developed a speed of 15¼ knots.

Eight of the new vessels of the navy are now afloat—the Dolphin, Atlanta, Boston, Chicago, Yorktown, Vesuvius, Charleston and Baltimore. Only two, however, the Dolphin and Boston, are in condition for service.

Top Mill Furnace, owned and operated by the Wheeling Iron and Nail Company, at Wheeling, W. Va., which has been undergoing repairs for some time, will blow in during the present week.

THE MECHANICAL ENGINEERS'

SCRANTON MEETING.

The ninth annual meeting of the American Society of Mechanical Engineers, at Scranton, Pa., began on Monday evening last, the opening session being held at the hall of the Young Men's Christian Association. In the absence of Mr. Horace See, the president, due to illness, there was no annual address, Mr. C. J. H. Woodbury presiding. The meeting was opened by an address of welcome delivered by Col. J. A. Price, President of the Scranton Board of Trade, in which, among other things, reference was made to the manufacturing wealth of Pennsylvania, with special regard to Scranton and its vicinity, and to the exhibition to be held at Scranton next year. This, in the words of Colonel Price, will be an exhibition of concentrated power of which great things are expected. Mr. Woodbury, after having responded to the cordial welcome extended by the city of Scranton, called upon Prof. R. H. Thurston, who presented two papers on closely related subjects. The first was on

THE DISTRIBUTION OF INTERNAL FRICTION OF ENGINES.

was then taken up. It having been found that the internal friction of an engine is invariable in any important degree with variation of power, it became an interesting and important problem to determine just how this engine friction is distributed among the various moving parts, journals, guides, stuffing boxes and piston rings. The experiments which were made for this purpose were carried out by Messrs. Carpenter and Preston with a number of different forms of engines. They were described and the results given, together with conclusions, in Professor Thurston's paper. The plan adopted was to first determine the friction of the machine in the manner already practiced by them and by their predecessors in this work, then to dismantle the engine, part by part, driving the connected parts by a pulley and belt from the main line of shafting overhead, through a transmitting dynamometer carefully standardized, and thus to secure measurements of the resistance of part after part until all the rubbing parts having been thus examined, the sum of their resistance at the normal speed of the engine should give the total internal friction of the engine and the percentages of the whole due to the resistances of each point of connection or rubbing. In each experiment the endeavor was made to secure precisely the conditions of operation, so far as was practicable, which were usual in its regular working. For instance, the engine was always heated up by its own steam when the resistances of the piston and the valves were to be measured; the speed of engine was kept the same when testing the friction of journals as when it was doing its full work; the valve, balanced and unbalanced, was tested under the usual boiler pressures, as well as unloaded, and exactly as possible, and thus every precaution that could be devised was adopted to secure precisely the results that should be observed, were such observation possible, when the machine was at work. The engine was first driven by the shafting, and through the dynamometer, with everything connected and the cylinder heated up to its usual temperature by a run, immediately preceding, under steam, the cylinder heads and steam chest cover only being removed to prevent any pump-like action of the engine while so driven. Next, the piston was disconnected, and the power demanded to give the engine its regular speed was observed with all other parts connected and moving, thus obtaining a measure of the friction of the piston alone by differences. Then the next point of connection would be broken, and another observation would give the friction of the next successive piece, and so on until the whole engine had been gone over, when the machine was assembled again, part by part, and thus a check obtained on the previous determinations.

The other paper by Professor Thurston was entitled "Variable Load, Internal Friction and Engine Speed and Work." In this results were given of an extended series of trials made with various engines under different speeds and loads, with a view of determining the variations of the internal resistances of the engines under the imposed conditions.

Bearing directly upon some of the points involved in both these papers was a paper by Mr. T. E. Denton, which was accordingly presented also before opening any discussion. It was entitled "The Friction of Piston Packing Rings in Steam Cylinders." The description of the apparatus used for measuring this friction and a reference to the diagrams obtained by its use will be found in another column.

Mr. Denton in opening the discussion referred to the effect of water lubrication in steam cylinders and to experiments made by him which showed that between the speeds of 36 and 150 revolutions per minute no appreciable difference in the piston friction of the particular engine under trial could be observed. Mr. Woodbury briefly spoke of the use of pumps for supplying oil to journals, and also of the excessive friction in some steam pumps, due to screwing down the piston rod glands too tightly. A pump which had come under his observation, and in which the area of the steam cylinder was more than four times that of the water cylinder, was totally inoperative from this cause. Mr. Denton, in referring to the fact that with increased loads there was no increase in the friction of an engine, asked for an explanation, and offered it as his view that the various journals exerted a pump action which drew in the lubricant between the bearing surfaces. This pump action, he thought, became more vigorous as the energy transmitted through the various journals was increased. As an illustration of it he exhibited a plug which had been ground to fit a ring within the $\frac{1}{50000}$ part of an inch. This plug if lubricated and inserted in the ring could be easily slid back and forth, providing it was kept going constantly, but the instant it was stopped it would stick. M. Geo. Schuhmann criticised the device designed by Mr. Denton for determining packing-ring friction, saying that it did not represent practical conditions, owing to the presence of steam-tight rings both above and below the ring of which the friction is measured. The steam acting on the outside of the ring did, in his opinion; exert an important influence upon its friction. Mr. W. F. Durfee drew attention to the effect of cylinder condensation on piston friction. In vertical engines, he said, the water of condensation was evenly distributed over the upper surface of the piston, and aided appreciably in lubricating the piston; while in horizontal engines the water, of necessity, accumulated on the lower side of the cylinder, and lubricated only that particular part. This Mr. Durfee considered an important feature in favor of vertical engines, several of which he had known to run satisfactorily for years without any lubricating oils whatever in the cylinders. Mr. Thos. S. Crane remarked that engines had been run without cylinder oils more than 30 years ago with thoroughly satisfactory results. Mr. J. F. Holloway suggested that the use of different kinds of piston packing rings might in a measure explain the varying degrees of piston friction. As directly opposed to the notion that water of condensation was an important aid to cylinder lubrication, Mr. W. E. Crane cited a case where an uncovered steam pipe supplied steam, presumably somewhat wet, to an engine. Serious difficulty with excessive friction was experienced until the pipe was covered with a non-conductor. The trouble then vanished immediately. This was found to be the case on several occasions when it was necessary to make alterations in the pipe arrangements, the supply pipe at these times being left temporarily uncovered. As regards the pump action of journals Professor Thurston thought that, where the latter were loose, such action might be very effective. He referred, also, to the influence of distorted journals, where the latter were not stiff enough to resist springing, and cited the case of the United States ironclad Dictator during the war, the shaft of which gave so much trouble from this cause that it was impossible to run the engines up to full power. Mr. Denton expressed his confidence that an engine would run fairly well without cylinder lubrication, and without danger of cutting, but he held it to be a mistake to suppose that there was no increase in friction under such conditions. Experiments which he had made showed that the increase was very decided, and the reason that it was thought not to exist in some of the older engines which had been run without oil was probably due to the fact that there were no means of determining it. The different parts in such engines were so extremely strong and stiff that the vibrations, which would ordinarily result from greatly increased friction in weaker structures, were not perceptible. As an illustration, he brought up the case of a Buckeye engine, in which the increased friction, due to discontinuing the use of cylinder oil, caused a loud clanking noise, which again disappeared on introducing oil. He cited also the case of the reverse lever of a locomotive, which, when oil was used on the valve, could be easily held in position with one hand. Leaving off the oil, the friction became so great that it was impossible for two men to hold the lever back. Mr. Denton's remarks concluded the discussion.

The meeting was adjourned shortly after 10 o'clock.

Tuesday, October 16.

The morning session was opened at 10 o'clock. The report of the council was first presented, and directed attention among other things to the invitation extended by the British Institution of Mechanical Engineers to hold a joint meeting at London next year, and also to visit Paris, where a joint meeting with the British Iron and Steel Institute is in prospect. Messrs. Wiley and Hutton were appointed a committee to give the matter further consideration. Thirty new members, four associates, and seven juniors were elected, bringing the total membership of the society up to 903.

Reports were also presented by the secretary for the Library and Finance committees, the committees on Uniform Tests, Standard Flanges, and Uniformity of Duty Trials of Pumping Engines. Progress in the work of all these committees was reported, and the committees themselves were continued. The report of the tellers, which was then presented, showed that the following officers had been elected for the ensuing year: President, Henry R. Towne; vice-presidents, Wm. Kent, Thos. J. Borden, and C. B. Richards; managers, Geo. M. Bond, F. H. Ball and William Forsyth; treasurer, W. H. Wiley.

A resolution was then offered by Mr. James T. Boyd, aiming at the reduction of the number of meetings of the society to one every year. An animated discussion

ensued in which a large number of members took part, among them Messrs. Babcock, Durfee, Holloway, Trump, Lyne, and Professors Thurston, Hutton and Wood, all of whom strongly opposed the resolution. On motion the latter was laid upon the table. Secretary Hutton having made several announcements relative to excursions and other details of the meeting, the first paper of the session was presented by Mr. Charles T. Main. It was on

THE USE OF COMPOUND ENGINES FOR MANUFACTURING PURPOSES.

Mr. Main stated that if steam is to be used for power exclusively the compound engine of proper design, in its common form, is now admitted by nearly all to be the most economical, especially if considered simply with reference to the efficiency of the steam, without considering the efficiency of the mechanism and the increased cost of the plant over other types. If more or less low-pressure steam is required for other purposes than power, this type in a special form can be used to advantage except in such cases as require nearly or quite the same amount of low-pressure steam as would be exhausted from an engine producing the amount of power required. Such a condition as this might exist where small amounts of power and large amounts of low-pressure steam are required, as in a dyehouse or printery, or in case a portion of the power is produced from water and the other portion from steam, the power of the latter being such as to supply the required amount of exhaust steam for the various purposes to which it is put. In such cases as these it would be absurd to add a condensing cylinder to the engine, and then supply the low-pressure steam direct from the boilers through reducing-valves. The proper type to use here would be the simple high-pressure engine for ordinary pressure, say up to 100 pounds per square inch above the atmosphere. Between these two extremes, of steam used for power only and an amount of low-pressure steam used equivalent to the whole amount exhausted from the engine, lie nearly all the cases of ordinary practice. Mr. Main then proceeded to determine which type is proper to use if a certain proportion of the steam from the engine can be used for heating purposes.

The paper was discussed at some length, special attention being drawn to the comparative value of steam and water power for mill use by Professor Hutton, who referred to a mill at Holyoke, Mass., where water power, though available and abundant, was not used, and a steam plant was erected. Mr. Babcock remarked that in some mills it was cheaper to use steam plants because large quantities of steam were used for purposes other than power, such as heating and dyeing. Mr. Durfee referred to a French design by which a water-wheel was made to drive a friction device, the heat generated being employed to raise steam for a mill. Attention was directed by a number of the speakers to the unreliability of water powers, which explained in a great measure the preference given to steam. The calorific value of coal and its bearing upon some of the results given in Mr. Main's paper was also touched upon. The question as to why the competition of low-cost water powers did not drive out the higher-priced steam plants was explained by the difference in location. Thus the low cost of production of a water-power mill might be counterbalanced by the cost of transportation to a market, while steam power mills could be located at the most desirable points and the ultimate cost of their product thus maintained sufficiently low to admit of successful competition.

Mr. W. F. Mattes, of the Lackawanna Iron and Coal Company, then addressed the meeting, and directed attention to some of the points of interest to be noted at the works of the company during the afternoon visit there.

Mr. C. H. Peabody followed with two papers, the first being entitled "Flow of Steam in a Tube," in which were given the results of experiments made in the mechanical engineering laboratory of the Massachussets Insittute of Technology. The results are of considerable interest on account of the lack of data bearing upon the subject, and together with the means by which they were obtained are referred to at greater length on another page.

Mr. C. H. Peabody next presented a description, together with results, of

A SIMPLE CALORIMETER,

which depends on the property that dry steam is superheated by wire drawing. The first calorimeter of this type was made as follows: A piece of pipe, 6 inches in diameter and 10 inches long, was capped at each end. In the upper end was fitted a ½-inch pipe, bringing the steam to be tested, a thermometer cup and a steam gauge. From the lower cap a 1-inch pipe led away the exhaust steam. The supply pipe brought steam from the main steam-pipe nearly overhead. Near the calorimeter was a T which formed a pocket, with a drip at the lower opening, and a branch from the side opening leading to an angle valve in the upper cap of the condenser. The pipe, further, was well wrapped with hair felt, and it was assumed that the steam had the same quality as in the main pipe. The calorimeter itself was wrapped in asbestos board and hair felt, and covered with Russia iron. Two other calorimeters have been made, which differ from the first only in size. One is made of a piece of 2-inch pipe, 8 inches long, and the other of a piece of 4-inch pipe of the same length. The only difference in the action of these three calorimeters appears to be that the smaller ones are more sensitive—*i.e.*, they respond more quickly to any change of condition.

The papers were discussed at some length by Mr. Denton, this concluding the session.

The Afternoon.

as already intimated, was devoted to excursions in the city, nearly, if not all, the visitors going to the works of the Lackawanna Coal and Iron Company. We cannot here attempt to particularize all the features of interest presented, the magnitude of the establishment, moreover, permitting only a hurried inspection. Two new sets of blowing engines for the steel department were in course of erection, and attracted a good deal of attention. They were built by the Dickson Mfg. Company, of Scranton, are of the horizontal type, and have blowing and steam cylinders 54 and 50 inches in diameter, respectively, with 5-foot stroke. They were built according to designs by Mr. W. F. Mattes. Probably one of the most interesting features about the works is the utilization of waste coal. The fuel used under all the boilers consists of a mixture of culm and pea and buckwheat coal; the company have no market for these last, and hence dispose of these coals in that way About 5000 tons per month are used, and the cheapness of the fuel explains what might otherwise appear to be a reckless disregard of all principles of economy in coal consumption. Rocking grates are used under the boilers, and an induced air-blast is led into each ash-pit. Thin fires are maintained so as to enable ready cleaning. The visitors, entering the blast-furnace blowing-engine houses, passed successively through the latter room, where the roll-turning is done, the rail mill, converter-house and other departments. An excursion was also made by a number to the Scranton electric-light station.

In the evening at 8.30 o'clock the society was tendered a reception by the Scranton Board of Trade, at the rooms of the Young Men's Christian Association.

Wednesday, October 17.

The Wednesday morning session was called to order at 10 o'clock. After some remarks had been made by Mr. G. H. Babcock on the flow of steam, the meeting took up a contribution by Messrs. S. W. Powell and W. L. Cheney on

A SYSTEM OF WORM GEARING OF DIAMETRAL PITCH,

directed attention to the fact that there is generally confusion in the shops which use both circumferential and diametral pitches for spur and bevel gearing, as many do where patterns are on hand for gears with cast teeth of circumferential pitch, and where cut gearing is made of diametral pitch. This confusion causes an unnecessary waste of time and often consigns a good casting to the scrap heap. It could be avoided, the authors say, so far as spur and bevel gears are concerned, by making all such gears of diametral pitch, and by making worm gearing also of diametral pitch. What they propose is to cut the worm thread to a fractional pitch corresponding to one of the diametral pitches now in common use; make the tooth the same length in worm gearing as is now used in spur gearing of diametral pitch, and make no change as to clearance on the top and bottom of the thread, if there is any allowed. They propose to thread the worms by means of a pair of transforming gears put into the train of change gears of any ordinary lathe. Many small and medium-sized lathes are made with the change gears in line, and here some provision would have to be made for compounding. This can be done in a great number of cases with very little expense by making the larger of the transforming gears "dished," or with the rim offset outward, and also making a new intermediate stud long enough to take the smaller of the transforming gears together with the gear which would be put on the spindle in ordinary screw cutting. In this arrangemtnt the larger transforming gear would be put on the spindle. Other arrangements will readily suggest themselves.

Some of the advantages which, according to the authors, would be gained by adopting this system for worm gearing are doing away with odd sixty-fourths and thousandths in the diameters of worm gears, and making their diameters come in even fractions; getting even figures in center distances between worm-gear shaft and worm-shaft or their bearings; doing away with considerable work in calculations in the drawing-room, in which there is always a chance for errors; and if in addition to using the diametral pitch and length of tooth we make the worm gears straight across the face, which, in most cases, seems to be practically as good as the more expensive way of making the points of the gear teeth follow the shape of the bottom of the worm-threads, the lathe man need not know whether the blank he was turning was to be a spur or worm gear.

A brief discussion by Mr Crane led up to the next paper on "An Improved Method for Finding the Diameters of Cone and Step Pulleys," by Mr. C. A. Smith. The subject was divided into two parts, the first consisting of brief rules, for the practical man, for finding the correct diameters, and the second giving a history and analysis of the method.

Messrs. Sweet and Denton made some remarks, whereupon Prof. G. Lanza's paper on "The Strength of Cast Iron" was read. It contained a brief account of several sets of tests upon the strength and other resisting properties of cast iron, carried on in the Laboratory of Applied Mechanics of

the Massachusetts Institute of Technology, and recorded the results obtained. The subject thus brought up was dealt with by Messrs. Denton, Durfee and Barr.

Mr. J. E. Denton's paper on

THE IDENTIFICATION OF DRY STEAM

was then presented. The paper was divided into two parts, the first dealing with experiments with steam jets, and the second giving general expressions for the instrumental errors of condensing calorimeters for testing the quality of steam. Mr. Denton's conclusion from bis investigations were that jets of steam show unmistakable change of appearance to the eye when steam varies less than 1 per cent. from the condition of saturation either in the direction of wetness or superheating. It appeared further from the investigations that the instrumental error of portable condensing calorimeters does not theoretically interfere with the measurement of about 1 per cent. of variation in the heat of saturated steam. But in the use of such calorimeters there has always been found to exist an accidental variation of error considerably in excess of the theoretical instrumental error, even Regnault's magnificent work not being an exception in this respect. Consequently if a jet of steam flows from a boiler into the atmosphere under circumstances such that very little loss of heat occurs through radiation, &c., and the jet be transparent close to the orifice, or be even a grayish-white color, the steam may be assumed to be so nearly dry that no portable condensing calcrimeter will be capable of measuring the amount of water in steam. If the jet be strongly white, the amount of water may be roughly judged up to about 2 per cent., but beyond this a calorimeter only can determine the exact amount of moisture. A common brass pet cock may be used as an orifice, but it should, if possible, be set into the steam drum of the boiler and never be placed further away from the latter than 4 feet, and then only when the intermediate reservoir or pipe is well covered. The paper was discussed by Messrs. Emery, Peabody, Weightman, Babcock and Oberlin Smith.

An interesting paper on "The Cost of Power in Non-Condensing Steam Engines" was then presented by Charles E. Emery. To this we may have occasion to refer more at length in a future issue, and will, therefore, simply say at present that Mr. Emery supplied in it means of ascertaining the probable cost under all customary conditions by short and readily carried out calculations. Messrs. Denton, Barr and Wheelock spoke on the subject.

Prof. G. Lanza followed with a paper on "Counterbalancing the Action of the Reciprocating Parts of a Locomotive." In this an account was given of the experimental work that has been done in the Laboratory of Mechanical Engineering of the Massachusetts Institute of Technology in regard to the effect of different methods in use for counterbalancing the throw of the reciprocating parts of a locomotive. After a few remarks by Mr. Emery, a topical discussion closed the session.

THE AFTERNOON

was devoted to excursions to the works of the Dickson Mfg. Company, the Pine Brook Colliery, the Boies Steel Car Wheel Works and the works of the Suburban Elevated Railroad Company. In the evening another professional session was held, at which special attention was given to the discussion of "Steel Phenomena." To this we will refer again in our next issue.

To-morrow (Thursday) will be given up completely to an excursion. A special train will leave this morning for Hawley and Honesdale. After dining at the latter place the party will be conveyed by the gravity cars of the Delaware and Hudson Company over the Moosic Mountain via the Shepherd's Crook to Carbondale, and thence by the D. and H. main line back to Scranton through the Upper Lackawanna coal field.

The meeting so far has been well attended and much interest has been manfested in the proceedings.

Washington News.

(*From Our Regular Correspondent.*)

WASHINGTON, D. C., October 16, 1888.

The first session of the Fiftieth Congress is in the last stages of parliamentary existence. In the House, there has been no quorum for several weeks. In the Senate, the debate on the tariff bill is dragging along wearily and slowly. The Senators, as a rule, tarry long enough to work off their speeches on the subject, when they leave for home to await the verdict of the people on the 6th of November. There has been no quorum of the Senate for some days. Senator Allison says that the bill will not be voted upon until next winter, and it never was supposed that it would be. Senator Aldrich, one of the Sub-Committee who prepared the bill, says that he will not speak on the subject until next session. Senator Jones, another member of the Sub-Committee, has gone to San Francisco. The fate of the Senate tariff bill will be dependent entirely upon the verdict of the people on the Presidential nominees. If General Harrison shall be elected, it will mean that the people indorse the Senate idea of tariff revision. If President Cleveland should be elected, it is not likely that any further effort will be made to bother about the bill.

In the same connection it would be no surprise if the Mills bill would get through the Senate, as the weak-kneed senators, with the vote of the people before their eyes, might find ample reason to support a bill, which, on issue as it now stands, received popular endorsement.

There is no doubt that the election three weeks hence will have a decisive effect in determining the economic policy of the country in the direction of protection or free trade for some years. The discovery of the error in regard to coal in the Senate tariff bill has raised a decided commotion in political and industrial circles. Representative McComas, of the Cumberland District of Maryland, has been here and had a conference with Senator Allison. It appears that the item was inserted at the suggestion of the New England senators, but was intended to read Coal-Slack or Culm, which will go through a ½-inch screen instead of Coal, Slack or Culm, &c. Senator Allison has made a public statement in the Senate that the error will be corrected with other amendments proposed to the bill. It must be confessed that the Senate bill is not wholly satisfactory to the iron men, although Senator Aldrich says that, as a rule, it meets with very general approbation.

If the Republicans carry the day, the bill will be much amended in the direction of protection.

Rifles of Small Caliber.

With the introduction of repeating rifles for purposes of war a reduction in the caliber of the barrel became almost unavoidable. The French Government perceived this at a very early date, and the new Lebel rifle issued to the French army has a bore slightly less than ½ inch. Austria and Germany for economical reasons retained in their new repeating rifles the caliber of the old breech-loaders with which their armies had hitherto been furnished. This policy, however, has proved to be of the penny-wise type, as both Governments have now found it necessary to adopt the small bore, which has, in the first place, the advantages of decreasing the weight of the arm and increasing the number of cartridges which a soldier can carry with him into the field, and, since the adoption of the magazine is likely to lead to increased rapidity of fire, this becomes a matter of the first importance. Again, as the flatness of the trajectory depends, other things being equal, on the initial velocity of the shot, which, again, is dependent on the ratio of the weight of the shot to the powder charge, the small caliber has another advantage, for, with a large caliber, the ratio of the weight of the shot to that of thepowder cannot be made to have the most advantageous value without increasing the powder charge or unduly diminishing the length of the shot. The former plan is out of the question, as the kick of the weapon is quite as great as is pleasant to the marksman now, while the latter remedy is also incapable of adoption, as it would lead to inaccuracy of fire. Both these objections can, however, be got over by the adoption of the small bore, as the powder charge need not be altered, and the length of the bullet may be made equal to that found practically to give the best results. In the Werndl rifle of the Austrian Government, the caliber of which is 11 mm., the pitch of the rifling corresponds to one turn in 724 mm., while in the Swiss Hebler rifle, having a caliber of 7.5 mm. and an initial velocity of about 1900 feet per second, the pitch is 240 mm. But by thus increasing the pitch it becomes necessary that the bullet should, to take the rifling, be provided with a thin outer shell of some harder material than lead. In the Lebel rifle a skin of German silver is used, and in the new rifle for the British Army it is proposed to employ a thin shell of steel for this purpose.

The General Deficiency bill just passed by Congress, and which is virtually the last act of the session as concerns appropriations, makes a total formidable in amount. There were five deficiency bills the present year, aggregating $19,561,382.52. This makes the total apppopriated by bills purely for that purpose $296,824,434.31. To this must be added the permanent annual appropriations, amounting to $115,-640,798.90, which require no bills. The miscellaneous appropriations for the present year will figure up $9,500,000, as against $4,811,991.49 last year. The estimates of the departments for the fiscal year were $302,303,164.74, and of this amount asked for $296,824,434.31 was granted by Congress. Of this sum but $282,363,370 was in the bills when they were reported to the House from the various committees, the increase of $14,-401,106.31 being added in the House or Senate. The estimated revenues for the year are $440,563,734.32, out of which must come about $422,000,000.

Our Pittsburgh correspondent telegraphs us that important changes have taken place in the firm of Carnegie, Phipps & Co., Limited, and of Carnegie Brothers & Co., Limited. John Walker has resigned the chairmanship of Carnegie, Phipps & Co., on account of ill health, retiring altogether. He is succeeded by W. L. Abbott, till now vice-chairman, the latter post being filled by H. Curry. W. P. Palmer has been elected secretary. Henry Phipps, Jr., has resigned the chairmanship of Carnegie Brothers & Co., Limited, but retains a financial interest. David A. Stewart, until now vice-chairman and treasurer, is his successor, while J. G. A. Lieshman becomes vice-chairman.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St. PHILADELPHIA, Pa., October 16, 1888.

Pig Iron.—The market is a shade quieter this week, but it cannot be said that prices have weakened, although the feeling is hardly as buoyant as it was some time ago. The increase in the output is probably having some influence, although as yet there is no indication of over-supply; neither is there any manifestation on the part of makers of a desire to extend sales for deliveries beyond their usual limits of time. Consumption is very large, however, and it seems as though the last quarter would be much the heaviest of the whole year, so that prices are not likely to vary a great deal, neither is there any great probability of stocks accumulating. The comparative dullness of the market, therefore, may be due, as we said before, partly to knowledge of the fact that production is increasing, and in part to the fact that purchases could not be duplicated to any extent without paying an advance in prices of more or less importance. Under these circumstances consumers are willing to wait further developments, such as the result of the Presidential election, as well as to see what effect the increase in the furnace output will have, and also to ascertain if any further increase will be made. A waiting market, therefore, is the natural outcome of recent events, and does not by any means indicate that prices are likely to react. For the present, all the good Iron that is made finds its way direct into consumers' yards, so that those who are waiting for desirable brands at prices ruling five or six weeks ago may perhaps have to wait a long time before their orders can be placed. Still there is an impression that prices are high enough for a permanency, and that a further advance might be somewhat perilous. Meanwhile quotations vary from $18 to $19 at tide for No. 1 Foundry, $17 @ $18 for No. 2, and $16 @ $16.50 for Gray Forge, according to character of brand, &c., with a few choice makes at the usual premium of 50¢ to $1 ℔ ton.

Blooms.—Prices are steady, and the demand moderately active at about last week's prices, say: Nail Slabs, $29 @ $29.50, at mill; Billets from $32 to $36, according to analysis; Charcoal Blooms, $52 @ $54; Run-out Anthracite $42 @ $44; Scrap Blooms, $33 @ $35 ℔ "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, $30 @ $31 for Nail Slabs; $34 @ $36 for 4 x 4 Billets, and $35 @ $39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—The scarcity of good Bars has finally resulted in advanced prices, which are now quoted at $29 @ $29.50 at mill, or $30 @ $30.50 delivered, with sales at these figures, holders showing increasing firmness at the extreme outside rate.

Bar Iron.—There is not quite as much firmness in Bars as was noticeable a week ago. Some of the Western mills have been offering Bars at much lower figures than those named by local concerns; but it is not known that they have taken much business. Mills around here are so full of work that they have not changed figures, although on a firm offer for a desirable specification some of them might be inclined to do so, but it would depend on the amount of work they had on their books, and the kind of order that was offered to them. Skelp Iron is still in good demand, and strengthens the Bar mills considerably. A lot of 1500 tons was taken yesterday at 1.95¢ for Grooved, although 2¢ is the usual quotation for the general run of orders. Bars are 1.85¢ @ 2¢ for best makes, and, apart from Western competition, these are considered to be firm quotations

Plate and Tank Iron.—Reports on this class of trade are somewhat contradictory. There is undoubtedly a great deal of work on hand, and prospects seem to be very encouraging, but prices are irregular. They are a trifle higher than they were early in September, and are steady at the advance, but that appears to be all that can be said. Large orders are sharply competed for, and only small or medium sized lots command full quoted rates, which are about as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3¼¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—There is not much new business coming in, and some of the mills are beginning to feel a little anxious for orders. Deliveries on old contracts comprise the heaviest portion of the work that is going on, although there is a fair daily demand for small lots. Prices are unchanged as follows: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel

Sheet Iron.—The demand is well maintained and mills are getting all the work they can handle for the present. Prices are unchanged, and for small lots of the best makes are about as follows:

Best Refined, Nos. 26, 27 and 28	3¼ @ 3½¢
Best Refined, Nos. 18 to 25	3 @ 3¼¢
Common, ¼¢ less than the above.	
Best Bloom Sheets, Nos. 26 to 28	4½ @ 4¾¢
Best Bloom Sheets, Nos. 22 to 25	4 @ 4¼¢
Best Bloom Sheets, Nos. 16 to 21	3½ @ 3¾¢
Blue Annealed	2.8 @ 3 ¢
Best Bloom, Galvanized, discount	62½ %
Common, discount	67½ %

Steel Rails.—Small lots are in fair demand at about $29 at mill, but large orders are not on the market at present. There is not much doing for next year's delivery, sellers being almost as indifferent as buyers are, until they can see a little further ahead. The extreme range of prices may be given as $28.50 @ $29.50 at mill, according to quantity, delivery, terms of settlement, &c.

Old Rails.—There is still a singular lack of business in this market. Buyers are bidding $23 for T's, and sellers are offering mixed lots of T's and D. H.'s at $24, which may be taken at about that figure. Sales for deliveries at interior points are reported at from $24.50 to $25, but there is nothing doing in spot lots.

Scrap Iron.—The feeling is a shade firmer, holders asking extreme figures, with plenty of demand at slight concessions, which, however, are not granted. Quotations about as follows: $21 @ $21.50 for cargo lots; $21.50 @ $22.50 for carload lots, delivered, or for choice $23; No. 2 do., $14 @ $15; Turnings, $13 @ $14; Old Steel Rails, $20 @ $21; Cast Scrap, $15 @ $16; do. Borings, $9 @ $10; Old Fish Plates, $25 @ $26. Old Car-Wheels, $17 @ $18, Philadelphia, or its equivalent.

Merchant Steel.—A fair demand at prices quoted herewith—viz.: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Open-Hearth Ordinary Spring, 2.7¢ @ 2.9¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Wrought-Iron Pipe.—The demand seems to be increasing, and manufacturers are greatly crowded with orders. Prices are unchanged, but the feeling is so strong that a reduction in discounts may be made at an early date. Meanwhile they remain as last week, viz.: Black Butt-Welded, 52½ %; Galvanized do., 42½ %; Black Lap-Welded, 62½ %; Galvanized do., 52½ %; Boiler Tubes, 60 %.

Nails.—There is no material change to notice, although the demand is probably a little better than it has been for some time past. Prices are quoted at from $1.95 to $2 from store, and on the whole these figures are fairly maintained for standard quality of Nails.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St., CHICAGO, October 15, 1888.

Pig Iron.—A few good sales are reported as having been made to the general foundry trade, and some dealers enjoyed a fair run of 50 to 100 ton orders, but others have had a very dull week. The high prices asked for certain brands have checked their sales for the time being, and they are practically out of the market until the prices of other brands advance or the makers are willing to allow a concession. Inquiries are being received from Car-Wheel manufacturers who need an additional supply of Charcoal Pig Iron, and the rapid depletion of the stocks of others will cause them also to renew purchasing, so that the demand from this source is shortly expected to develop considerable business. The architectural foundries are the dullest in the list just now, but they are reaching out for work in new channels, and prospects are bright for some of them to secure good contracts. It is expected that one of the local foundries will be able to capture a 4500-ton order for Castings for a cable road in Kansas City, which will be given out this week. Prices of Southern Coke Iron are a little easier, and if there is to be any break in the general firmness now manifested along the line it will probably begin with this Iron, which has for some time had but little foothold here. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, $20 @ $21; Alabama Car-Wheel, $26.25; Jackson County Softeners, No. 1, $17.50 @ $18.50; Hocking Valley Soft Foundry, No. 1, $17.50 @ $18; American Scotch (Blackband) No. 1, $19.75 @ $20; other Ohio Scotch Irons, No. 1, $18 @ $19; Lake Superior Coke, No. 1, $18 @ $19; No. 2, $17 @ $17.50; No. 3, $16 @ $16.50; Southern Coke, No. 1 Foundry, $17.75 @ $18; No. 2 Foundry and No. 1 Soft, $17.25; No. 3 Foundry and No. 2 Soft, $16.50; Gray Forge, $16.

Bar Iron.—The general market has been exceedingly dull. Sellers are anxiously waiting for the expected closing of large contracts for cars which have been pending for some time, and which will require a considerable quantity of Bar Iron. The "car talk" runs high into the thousands, but the only orders which are deemed positively certain to be placed at this time will foot up about 4000. Mill agents are of the opinion that car specifications will rule about 1.75¢, flat, delivered, but it remains to be seen how well the price will be maintained when actual orders are in sight. Weakness among manufacturers is rumored with persistency, but agents all insist that prices of Common Iron are firm at 1.75¢ @ 1.80¢, half extras, f.o.b. Chicago, for mill lots. Store prices for small lots range from 1.90¢ to 2.10¢, according to quantity and quality. Sales of Splice Bars have been made at 1.85¢ @ 1.90¢, delivered.

Structural Iron.—Business is quiet and without any special feature. Mill lots are quoted as follows, f.o.b. Chicago: Angles, 2.20¢ @ 2.25¢; Universal Plates, 2.25¢; Tees, 2.55¢ @ $2.65; Beams and Channels, 3.40¢. Prices from store are: Angles, 2.35¢ @ 2.50¢; Tees, 2.60¢ @ 2.75¢; Beams, 3.80¢. A moderate movement in Car-Truck Channels is reported at 2.45¢ @ 2.50¢, Chicago.

Plates, Tubes, &c.—An improved demand for Plates has been experienced, trade from store having been heavy during the week, with a satisfactory sprinkling of mill orders. The volume of business is fully up to that of last year in this branch. Prices are firmly maintained, both from mill and from store. Tubes have advanced about 4 %, and the mills are so well supplied with orders that another upward turn would not be surprising. Stocks of tubes here are quite small, so that the advance takes effect at once. Quotations from store are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60⅓ % off.

Sheet Iron.—Mill agents are still unable to supply the demand upon them for light gauges. A few sales have been made for December delivery at 3¢ at mill for No. 27, but the urgency is for earlier deliveries. Small lots from store are sold by jobbers at 3.20¢ for No. 24, 3.30¢ for Nos. 25 and 26, and 3.40¢ for No. 27.

Galvanized Iron.—The situation is unchanged, stocks in warehouses here being more badly broken than ever and the mills still far behind in their orders. The lighter sizes continue to be in greatest demand. Contrary to the general expectation, prices remain as previously quoted—namely, 60 % off for Juniata and 60 and 5 % off for Charcoal, in small lots.

Merchant Steel.—The current trade is now confined to small lots from local consumers, but is by no means dull on that account, the sales of the past week being very satisfactory. Association prices are quoted without variation as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Small orders accumulate from week to week, sufficient to keep up a semblance of business, but not to impart activity to the trade. The Union Steel Company will shut down their works this week for lack of orders, but the North Chicago and Joliet mills will be kept going for another month or two. Inquiries are becoming more numerous for prices on deliveries next year, but the quantities named are about one-third of the usual requirements of each company, which is not very reassuring. As far as can be learned, no prices have been fixed in this market on next year's business. Rumors are current of sales for early delivery at low prices, but the manufacturers contradict them, and quote $30 as the minimum.

Old Rails and Wheels.—In spite of general expectations, the price of Old Iron Rails holds its own well. A sale of 1000 tons was made at $23.50, and another of 500 tons at $24, and some holders are expecting to realize $24.50 on lots which they control. Consumers in this vicinity appear to be well supplied for the present, but, on the other hand, the railroads are not offering Old Rails in any considerable quantity. Old Car-Wheels are nominally quoted at $20, with very light transactions reported.

Scrap Iron.—A large part of the available supply of Wrought Scrap in this vicinity was bought for consumption last week. More inquiries are in the market, and bids at a shade below quotations have been refused. Mill Scrap is also in some demand, and Cast is beginning to move. Steel is rather quiet, but a few transactions are noted in this class of material also. Dealers are now paying $14 @ $15 for Mixed Country Scrap. The selling prices of carefully selected Scrap are as follows, ℔ ton of 2000 lb: No. 1 Forge or Railroad Shop, $21; Track, $20; No. 1 Mill, $16.50; Pipes and Tank, $12 @ $13; Light Wrought, $12; Horseshoes, $20; Axles, $26.50; Cast Machinery, $15; Stove Plate, $12; Cast Borings, $10; Wrought Turnings, $12.50 @ $13; Axle Turnings, $15; Coil and Leaf Steel, $17; Locomotive Tires, $16.

Hardware.—The volume of business continues about the same as that of September, merchants generally reporting a good influx of orders, with the prospects very favorable for the immediate future. No discouraging symptoms have appeared in any branch, and prices are being maintained very well. Collections are not so good as might be expected, but this is explained on the ground of the upward movement in values of farm produce. As farmers rarely sell on a rising market, those who deal directly with them will be obliged to wait until they are influenced to dispose of their stocks of grain, &c. This causes a general tightness of money all along the line.

Nails.—The manufacturers of Cut Nails have apparently weakened in their attempt to hold up prices until the combination is formed. Last week the most obstinate supporters of the regular price gave way and the rate named by one or two concerns became common. Other concessions followed on the part of the leaders in reducing prices, and Steel Nails were sold here from factory at about $1.90 These low rates were not made to secure large orders, as might be supposed, but to make sales of 1000 kegs and less, and it is very probable that the volume of actual business was not increased in the least by the break. Jobbers are quoting Steel Cut Nails at $2.05 @ $2.10 and Wire Nails at $2.60 @ $2.65, in small lots, and report a fair trade in progress, but no demand for carloads worth mentioning.

Barb Wire.—The demand is still very limited, and prices are extremely irregular. Small lots from store are quoted at 2.90¢ for Painted, and 3.60¢ @ 3.65¢ for Galvanized.

Pig Lead.—This market has been dull recently, and prices have receded from 5.05¢ to 4.90¢, with very slight transactions. Consumers seem to be well supplied and not inclined to speculate on the future condition of trade.

Copper.—Manufactured Copper holds its own at 25¢ rates, with fair quantities of Sheets going into the hands of roofers, and some demand from other classes of consumers.

Joseph T. Ryerson & Son, 18 to 22 Milwaukee avenue, Chicago, have issued a stock sheet for October, showing the number and size of the Iron and Steel Plates and Sheets in their warehouse at the beginning of the month. It is a 24-page pamphlet of convenient size, and contains in addition to the stock list a great deal of information of interest to Boiler and Tank manufacturers. Special attention is called to the new Eclipse Manhead, which is therein illustrated and described. This is said to be the only solution of a tight joint for a manhole. The Manhead rests on a heavy lead gasket, and can be taken off and put back again without renewing the gasket.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave., PITTSBURGH, October 16, 1888.

Pig Iron.—Brokers and furnacemen report little or no change during the past week; there is a very fair demand, and prices are steady. There is no pressure on the part of furnacemen to sell, nor any particular anxiety on the part of consumers; many of the former are sold up for the present year, while many of the latter have covered their wants for the same time. The opinion generally obtains that there will be but little change in prices between now and January. It is encouraging to know that the spirit of speculation which at one time threatened to take hold of Pig Iron has died out, and is not likely to come to life again at present. Our market is in an exceedingly healthy condition, and the business is between producers and consumers, with the assistance of the brokers, who help to get the former together. The great proportion of the Iron used here is the product of furnaces here, and in the Shenango and Mahoning valley districts, very little, if any, coming here from east of the mountains, while in regard to Southern Iron there has been none sold in this market for several years. We quote prices as follows:

Neutral Gray Forge	$16.00 @	$16.50,	cash.
White and Mottled	15.00 @	15.50,	"
All Ore Mill	17.00 @	17.25,	"
No. 1 Foundry	18.00 @	18.50,	"
No. 2 Foundry	17.00 @	17.50,	"
No. 1 Charcoal Foundry	24.00 @	24.50,	"
No. 2 Charcoal Foundry	22.00 @	22.50,	"
Cold Blast Charcoal	25.00 @	28.00,	"
Bessemer Iron	18.00 @	....	"

Included in the sales reported was a lot of 1200 tons Gray Forge, for December delivery, at $16, cash; 1000 tons Bessemer at $18, cash, and 900 tons Charcoal, for mill use, at $19, cash.

Muck Bar.—There is a fair business at unchanged prices, $28.50 @ $29, cash. Sales of some 2000 tons reported at $28.50 @ $28.75.

Manufactured Iron.—There is a continued steady demand for all kinds of Finished Iron, and the mills generally are pretty well employed, some of them working double time. No change in prices, which, as already stated, are low as compared with cost of Pig Iron. Bars at 1.80¢ @ 1.85¢; Plate, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢. There has been quite an active demand for Sheet Iron for some weeks past, as there usually is at this season of the year. There is no apparent abatement in the demand as yet for Skelp Iron, but there will be within a few weeks, as the Pipe trade commences to fall off the latter part of this month. Grooved is still quoted at 1.85¢ @ 1.90¢, and Sheared at 2.10¢ @ 2.12¢.

Nails.—The Nail trade continues light, and there is but little prospect of any improvement until toward spring. Prices are steady at full card rates, but they are unremunerative; yet trade is so light that it is not likely that there will be any immediate effort made with a view to advancing them. We continue to quote upon a basis of $1.90 for 12d to 40, 60 days, 2 % off for cash.

Ferromanganese.—Sales of 80 % Ferromanganese at $56.50 @ $57. Sales of Speigel at $28 @ $28.50 for 20 %.

Wrought-Iron Pipe.—There appears to be no falling off in demand, and prices are reported firm at the advance of last week. Mills generally are running pretty full, but the demand, it is probable, will commence to fall off with the close of this month. Discounts on Black Butt-Welded 52½ %; on Galvanized do., 49½ %; on Black Lap-Welded, 62½ %; on Galvanized do., 52½ %; Boiler Tubes, 60 % off; 2-inch Tubing, 13¢ ℔ foot net; 5⅝-inch Casing, 40¢ ℔ foot, net.

Old Rails.—There has been little or no new business in Old Iron Rails during the past week, but while the market is less active prices are still maintained. Consumers are pretty well stocked for the present, but stocks in hands of sellers are not large, and there is no disposition to force sales. We continue to quote American Tees at $25 @ $25.25, cash, at which the last sales reported were made.

Steel Rails.—Heavy sections are quoted at $29, cash, delivered on cars at works in Pittsburgh.

Billets.—There is a continued good demand for Billets, which may be quoted at $29.50, cash, at makers' works, and Nail Slabs at $29. Sales of Rail and Bloom Ends reported at $19 @ $19.50. Some brokers report domestic Rail Crops in better demand and firmer.

Merchant Steel.—There is a fair business, and prices are steady as quoted. Best Brands of Tool Steel, 8½¢ ℔ lb; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Open Hearth Machinery, 2¾¢. Merchant Steel Mills are pretty fully employed.

Railway Track Supplies.—Spikes are higher, 2.10¢, 30 days, delivered; Splice Bars remain unchanged, at 1.80¢ @ 1.85¢, and Track Bolts, at 2.85¢ with square, and 2.95¢ with hexagon Nuts.

Old Material.—There is a fair business, but prices remain about as last quoted. Sales No. 1 Wrought Scrap at $21, net ton; one sale reported at $21.50; Car Axles, $26 @ $27; Wrought Turnings, $14 @ $15; Cast Scrap, $16 @ $16.25, gross ton; sales 1000 tons, at $16; Cast Borings, $12 @ $13; Car Wheels, $20; sale long lengths Steel Rails at $20.50, gross. There has been an unusually brisk demand of late for Old Car-Wheels at points west of Pittsburgh, and desirable lots are bringing full prices.

Cleveland.

CLEVELAND, October 15, 1888.

Iron Ore.—Buyers who had hitherto failed to make purchases sufficient to last through the winter have been in the market during the past week, and have bought liberally at the low quotations made possible by the declining lake freights. Ore is being pushed down from Lake Superior so rapidly that the season's shipments are now only about 125,000 tons behind those reported at a corresponding period last year, and the gap seems likely to be completely closed by December. The sharp advance in Pig Iron in September brought about an almost unprecedented demand for Ore, and thoroughly undermined the calculations of those who had estimated the total output for 1888 at 3,500,000 tons. The season's sales, including the unsold Ore on dock at the opening of navigation, seem likely to reach 4,500,000 tons, unless the lake carriers are forced to tie up earlier than usual. The transportation rate from Escanaba to lower lake ports has now declined to $1.25 ℔ ton, and if any Ore is left at the docks at that port at the close of navigation it will not be the fault of vesselmen. Bessemer Hematites have sold during the week at $5 ℔ ton; Menominee Bessemers at $5.25 @ $5.35; and Gogebic Bessemers at $5.25 @ $5.40.

Pig Iron.—The market maintains all the elements of strength hitherto noted, with a steadily increasing tendency toward better prices. Sales of Standard Iron at the valley furnaces at $18, cash, are reported. Mill Irons are selling freely at $16.50 @ $17, cash, and Bessemer Pig is in such excellent demand that a scarcity in stocks seems probable before the end of the year. Furnacemen are not inclined to grant concessions nowadays, at least during the continuance of the present heavy demand. The consumption of Iron is everywhere reported to be very heavy. Local dealers are inclined to attach considerable importance to the outcome of the Presidential contest, and to look upon the possible success of the Republican ticket as a guarantee of the continuance of the present firm tone of the market.

Manufactured Iron.—Common Bar is selling at 1.70¢ from the mills and 1.75¢ from store, with a satisfactory demand. Sheets of all numbers are scarce, and the mills will not book large orders for delivery after December 31st.

Scrap Iron.—Old American Rails cannot be bought for less than $25, and there seems to exist no demand at that figure. Axles are quoted at $24 @ $26 and Skelp $20.

Nails.—Iron and Steel Cut Spikes are still selling at $2.50 and $2.75 respectively, while Steel Wire Nails at $2.65 seem in good demand.

Louisville.

LOUISVILLE, KY., October 15, 1888.

Pig Iron.—The market has been satisfactory during the week, with a fair amount of sales. The manufacturers state they have enough work to keep them busy until the close of the year, and think that as soon as the election is over orders will increase rapidly. The car companies are running full time and the business outlook is very good. Old Rails are quiet, but there is a strong demand for Old Wheels. We quote as follows:

Southern Coke, No. 1 Foundry	$17.00 @ $18.00
" No. 2 "	16.00 @ 16.50
" No. 2½ "	15.50 @ 16.00
Hanging Rock Coke, No. 1 Foundry	17.25 @ 17.75
Hanging Rock Charcoal, No. 1 Foundry	21.00 @ 23.25
Southern Charcoal, No. 1 Foundry	18.00 @ 18.50
Silver Gray, different grades	14.50 @ 15.25
Southern Coke, No. 1 Mill, Neutral	14.75 @ 15.25
" No. 2 " "	13.75 @ 14.75
" No. 1 " Cold Short	14.25 @ 14.75
" Charcoal, No. 1 Mill	15.75 @ 16.50
White and Mottled, different grades	13.50 @ 13.75
Southern Car-Wheel, standard brands	23.00 @ 24.00
Southern Car-Wheel, other brands	19.25 @ 21.25
Hanging Rock, Cold Blast	22.25 @ 25.25
Hanging Rock, Warm Blast	19.25 @ 20.25

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,
CHATTANOOGA, October 15, 1888.

Commercial matters are showing a somewhat increased activity. The gathering of the cotton crop is now going forward to its fullest extent, and while it is somewhat behind the season, yet general report says it will be the largest of any previous year. The marketing of this article is having its usual disturbing influences on the money market, making it extremely close, and the manufacturing interests are being put off by the banks for the purpose of accommodating a more profitable set of customers. A prominent banker remarked a day or two since that there was not one-fifth of the necessary capital in this town to do the legitimate business that is offered, yet, with that same bank, there is no paper discounted at less than 10 and 12 %, and only the best at that. Street discounts command 18 to 24 %.

Pig Iron.—But little change can be observed in the general condition of the market. The demand is, however, mostly for small round lots from Northern and Eastern consumers, while the Southern foundries are confining themselves, generally, to one and two carloads, and could hardly be expected to do otherwise, being so near the close of the year, as nearly every concern desires as close a management at that time as is consistent with their business. Yet, with all this, there are sufficient sales to keep the output well sold up and the yards quite bare of stock, Not only have all the furnaces shown a marked increase in quantity during the past two or three months, but the output of Foundry has largely increased over Mill. The market seems to have settled down to $14 @ $14.50 for No. 2, and $15 @ $15.50 for No. 1, in lots of two to four carloads, while in lots of a few hundred tons there may be a concession of perhaps 25¢. At the same time, we note a sale of 400 tons good No. 2 at $14.50, cash, at the furnace (recent grading). The general opinion among Iron producers is that the market will remain about as it is during the year, or, at least, until after the Presidential election, although many seem to think that that event will have but little effect upon the market, no matter which way it goes. The fact that quite a number of inquiries have been made for large round lots for delivery during the first six months of 1889, by concerns who are very large consumers, would seem to indicate a belief on their part that there will be but little business disturbances for the next year or so.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts.
CINCINNATI, October 15, 1888.

Pig Iron.—There has been some increase in the inquiries for Pig Iron in the local market during the past week, and a few dealers have been fortunate enough to secure larger and more numerous orders, while others have been unsuccessful in obtaining new business of moment. Most of the orders received are for small amounts, but buyers want prompt shipment. There has been some delay recently of Iron in transit, due to heavy traffic on railroads, which has been a source of annoyances, not to say loss, to some furnaces running close upon stocks. A more confident feeling is apparent among consumers, while sellers have lost none of their assurance. Some large contracts are reported to have been made, but the details of the transactions are not made public. Some minor changes have been made in prices of Southern Iron, but the selling rates on the Northern products have been unchanged. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.	
Southern Coke, No. 1	$17.00 @ $18.00
Southern Coke, No. 2	16.00 @ 17.00
Southern Coke, No. 3	15.50 @ 16.00
Ohio Soft Stone Coal, No. 1	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2	15.50 @ 16.00
Mahoning and Shenango Valley	17.50 @ 18.50
Hanging Rock Charcoal, No. 1	20.50 @ 22.50
Hanging Rock Charcoal, No. 2	19.50 @ 22.00
Tennessee and Alabama Charcoal, No. 1	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2	17.00 @ 18.00
Forge.	
Strong Neutral Coke	14.75 @ 15.25
Mottled Neutral Coke	13.75 @ 14.00
Gray Forge	14.50 @ 14.75
Car-Wheel and Malleable Irons.	
Southern Car-Wheel	20.00 @ 23.00
Hanging Rock, Cold Blast	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable	20.50 @ 21.50

Nails.—There has been a fair jobbing demand, and the market has ruled firm. Jobbing prices are based upon 12d @ 40d, which sell at $2.10 ℔ keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at $2.10 and Steel Wire Nails at $2.75 ℔ keg.

Manufactured Iron.—The mills and foundries have been busy, and a firm tone has prevailed without change in prices. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ ℔ lb.

Old Material.—The market for Old Rails has been quiet and without change of importance. One sale of Rails was made by a local road during the week at $24, but the market here is about $23, cash, the difference probably being accounted for by delivery, time or both. Old Wheels have been dull and nominal at $19 @ $19.50, cash, spot.

Detroit.

WILLIAM F. JARVIS & Co., under date of October 15, report as follows: The market remains unchanged, and while there is considerable buying, yet manufacturers do not desire to make any

further advance at present, but full prices are obtained for all orders taken. Buyers continue to request shipments hurried to them, and in many cases stocks are allowed to run so low before orders are given that should any delay occur on account of furnace not having the particular grades when order is received the consumer is put to considerable trouble and expense on account of the delay. Several orders for round lots from desirable customers at full prices have been refused by furnaces this week on account of the delivery being after January 1. With a steady and firm market we quote as follows:

Lake Superior Charcoal, all numbers	$20.00 @ $20.50
Lake Superior Coke, all ore	19.75 @ 20.25
Lake Superior Coke, cinder mixed	18.50 @ 19.00
Standard Ohio Black Band	19.75 @ 20.25
Southern No. 1	17.75 @ 18.25
Southern Gray Forge	16.25 @ 16.75
Southern Silvery	17.00 @ 17.50
Jackson County (Ohio) Silvery	18.50 @ 19.00
Old Wheels	20.50 @ 21.50

New York.

Office of *The Iron Age*, 66 and 68 Duane street, NEW YORK, October 17, 1888.

American Pig.—The reports of agents and dealers concur quite generally in representing the market to be quiet, but firm. We do not hear of sales of any magnitude, except in the case of one firm, representing Southern furnaces, who have done some business, partly for next year's delivery. It is stated that one of the leading Lehigh companies has an unusually large stock of Low-Grade Irons, but that the quantity of metal of Standard quality that is available is small. We quote: Standard to Choice No. 1, $18 @ $19; No. 2 Foundry, $17 @ $17.50, and Gray Forge, nominally, $16 @ $16.50.

Scotch Pig.—Only small quantities are being sold by importers, who claim that they are rapidly exhausting that part of their supply which they could apply to low freight charters contracted for in the past. We quote: Coltness, $21.50 @ $21.75, nominally; Shotts, $20.75 @ $21; Langloan, $21, and Dalmellington, $20.50 @ $20.75.

Spiegeleisen and Ferromanganese.—We hear of a sale of 2000 to 3000 tons of 20 % Spiegeleisen to an Eastern mill for delivery January and February, at a price which indicates that the seller is willing to take risks in freights. We quote $26.50 @ $27, according to time of delivery. There have been sales of several hundred tons of Ferromanganese at $54 for foreign, importers now asking $54.50.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.4¢; Steel Tank, 2.2¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢.

Steel Rails.—No sales of any consequence are reported by Eastern mills, though it is understood that negotiations are pending for a number of orders and that possibly some of them may have been placed. From the West it is stated that of the Chicago, Burlington and Quincy Railroad order 20,000 tons has been placed with one of the Chicago mills, while 10,000 tons has gone to Pittsburgh. The trade has been much interested during the past week in the interviews attributed to Mr. Carnegie, though his statements that Rails were selling at $28 at Pittsburgh is somewhat at variance with figures which have been quoted by the firm in that city for some time past. The outlook for Rails is not regarded as very encouraging. Up to the 1st of October, according to the report of the Board of Control, the shipments were 921,363 tons. Last year the shipments up to the same time were 1,390,825 tons. The sales had been 1,833,126 tons, while this year they have been only 1,134,883 tons. Last year the sales for 1887 delivery were nearly as large on the 1st of January of that year as they have been for 1888 delivery on the first of October, 1888. This is beginning to extend into the next year. On the 1st of October, 1888, the total sales for 1889 delivery footed up 40,000 tons. The outlook is therefore far from encouraging, especially when some other features in the railroad situation are taken into account. The developments among the Northwestern roads during the past few months, including such events as the passing of the St. Paul dividend and the reduction of that of the Atchison, together with the report that the Rock Island will build no further extensions—all these circumstances indicate what, for the near future, there may be expected in the way of new mileage by old companies in the Northwest. In some parts of the Southwest the situation is not much better. While it will be conceded that renewals are urgently needed with a good many lines, still even an active demand for that purpose is insufficient to give full and fair employment to our Rail mills unless it was accompanied by a demand for new construction, represented by a minimum of 6000 to 8000 miles of new road. There are a number of inquiries in the market, partly for next year's delivery, among them being one for an Oregon road, for which figuring is going on with Western mills overland, Eastern mills to tidewater and vessel, and English mills. So far as the latter are concerned, they are practically out of the market, since it would cost at least $48 to put Rails down at the Pacific port, while the domestic, via New York, could be delivered at about $42. We quote $28 @ $28.50 at Eastern mill.

Wire Rods.—The market is quiet, though there is some inquiry for early delivery. For prompt shipment we note a recent sale of 1000 tons at $39.25 to an Eastern Wire Nail manufacturer. We quote $39.25 @ $39. A meeting is to be held at an early date of the German syndicate. It remains to be seen what action it will take in face of the fact that the American market is being rapidly taken away from it by our domestic market.

Old Rails.—Outside of a lot of 1000 tons of Tees taken by an Eastern mill at $23.50, here, no business of consequence is reported in the market. A large consumer in the Pittsburgh district is reported to have secured some stock in other quarters. While the demand is not entirely filled, East or West, manufacturers are operating very carefully, though it is probable that any decline would bring out some buying. We quote, nominally, $23.50 for American Tees.

Financial.

The colossal "grain bulge" which has more or less affected all legitimate business in a large measure has subsided, so that, although prices of many staple commodities are unsettled, the tendency is toward a more stable basis. The reaction in wheat and breadstuffs in Chicago was at once manifest in this market, corn following, and day by day fluctuations have been less violent. On Monday there was again a sharp decline, wheat dropping 4¢ @ 4½¢, compared with Saturday. Several large houses were heavy sellers. Spots are heavy at the decline. Breadstuffs were dull, in the absence of demand, either domestic or foreign, the relative high prices on this side keeping exporters out of the market.

The effect of high prices of flour, which advanced here $2.25 in a month, is shown in the operations of West India and South American markets, whose trade heretofore has been almost exclusively with this point. Reports are that the West Indies are dickering with Spain for supplies of flour, also that South America is looking to Hungary for shipments by way of Trieste. Estimates made upon the basis of the Government report generally make the yield of winter wheat 276,000,000 bushels, and that of spring 134,000,000 bushels; total, 410,000,000 measured bushels, and equivalent to about 290,000,000 bushels of 60 lb. The Cincinnati *Price Current* estimates the total crop at 270,000,000 bushels of 60 lb. The Government returns for October show that the condition of the present corn crop has been equaled only three times in ten years and is exceeded materially only by that of 1879, when the condition was 98. The present average of condition is 92.

The Stock Exchange markets were generally dull, but strong. The street is now comparatively indifferent respecting the loaning rates of the Bank of England, since the free purchases by the Treasury and the consequent ease in money. A feature was the reaction in Atchison, Topeka and Santa Fé, from the previous rapid decline. New England followed the advance. On Friday stocks were almost stagnant, except for specialties, some of which record sharp advances. On Saturday the tendency was again downward. On Monday Lower prices in London, and the break in wheat induced caution and the market generally fell off. On Tuesday the market opened off and there was a further decline, led by New England, the grangers and the coal shares. Then came an irregular recovery.

Government bonds were weaker for 4s. Quotations are as follows:

U. S. 4½s, 1891, registered	108¼
U. S. 4½s, 1891, coupon	108¼
U. S. 4s, 1907, registered	127¼
U. S. 4s, 1907, coupon	127¼
U. S. currency 6s	121

Now that the Southern scourge is disappearing, speculation less rampant, and the financial situation improved, the business outlook is encouraging. The movement of freights is of unusual volume, partly in anticipation of the close of navigation. Florida routes, too, are reopened. From Chicago, during the second week in October, the total shipments were 62,000 tons, against 59,100 the previous week and 36,591 tons for the same week last year. The outward movement of cotton and corn will shortly be in large proportions. Cotton in this market is quiet; prices steady. Coffee firmer in a speculative way and teas pretty strong, but sugars are quoted a shade easier for raws. Lard dull and unsettled; trading light. Ocean freights—room for cotton and corn is in urgent demand, with engagements on a liberal scale.

The recent upward tendency in the rates for money was arrested by the acceptance by the Secretary of the Treasury of large amounts of bonds. Money on call averaged about 2½ %. The offerings of money on time were liberal, the demand small. Quotations were 4 @ 5½ % for four to six months on good collateral. There was only a moderate supply of commerial paper, and rates were 4¾ @ 5¼ % for 60 to 90 days. Simultaneously with the change for the better in the loan market on this side there was an equally pronounced movement in London, where rates settled considerably below the bank figure. The action of the open market in thus refusing to support the Bank of England revives apprehensions of gold shipments. Sterling exchange is quiet at $4.84½ @ $4.89.

Acting-Secretary Thompson issued the following: "Notice is hereby given that until otherwise ordered the Secretary will not accept offers of bonds that are held as security for National bank circulation."

The statement that the Department has practically decided to limit future bond purchases to a few millions a month is emphatically denied. There had been no change whatever in the policy of the Department. In the matter of future purchases, the action of the Department will be governed altogether by the "rates at which offers were made and the exigencies of the situation." The total amount of bonds purchased to date under the circular of April is $84,670,750, of which $51,392,000 were 4 per cents and $33,278,750 were 4½ per cents. The cost of these bonds was $66,005,539 for the 4s and $35,896,192 for the 4½s, making a total of $101,901,731. Notwithstanding these heavy payments the Treasury surplus is stated at $98,000,000.

The gross clearings of 38 cities show an increase of 3.4 % over last year; outside of New York, 10.4 %; New York gained 0.4 %; Boston, 10.6 %; Philadelphia, 5.4 %; Chicago, 17.3 %; St. Louis, 13.2 %; San Francisco, 0.9 %; Baltimore, 14.9 %; Pittsburgh, 17.4 %; Kansas City, 73.1 %; Milwaukee, 11.4 %; St. Paul 11.9 %; Omaha, 37.6 %; Minneapolis, 40.8 %; Denver, 34.5 %; Galveston, 41 %; Detroit, 34.8 %; Cleveland, 2.9 %; Indianapolis, 4.4 %; Hartford, 18.3 %; Peoria, 13.2 %; and Topeka, 87.2 %. Cincinnati decreased 11.7 %, New Orleans, 15.8 %; Louisville, 0.7 %; Providence, 9.7; Columbus, 15.5 %; Wichita, 19.2 %; Duluth, 9.1 %; Norfolk, 0.2 %, and Syracuse 12.3 %.

The weekly bank statement showed unexpectedly a decrease of $1,102,950 in the surplus reserve, notwithstanding the fact that the Treasury purchased during the week $19,815,850 of bonds and that the banks thereby gained nearly $11,000,000 from the Treasury in cash. The reserve now stands at $10,314,550, against $11,417,500 last week, $7,260,200 for the corresponding week in 1887, and about $4,618,900 in 1886. The heavy drain of currency was principally in aid of the movement of cotton in the South. The demand from the West was hardly as pressing. In loans there was an expansion of $1,606,800. Specie showed an increase of $147,100, and legal tenders decreased $823,300. Deposits increased $1,707,000, and circulation increased $1400.

The gross railroad earnings for the month of September make an unfavorable exhibit, due in part to the yellow-fever epidemic in the South, the small movement of cotton and comparison with heavy earnings in 1887. With the improvement in the rate situation, which now bids fair to become general, the movement of the crops, the activity in general trade and the prosperous condition of the coal trade, earnings for the last quarter of the year should materially increase.

The imports of merchandise at this port during the week were large, aggregating $9,053,900, of which about $2,500,000 represents dry goods. Total since January 1 $369,006,000, as compared with $370,843,000 for the same time last year and $343,126,000 in 1886. Exports were $6,769,000, including 700,000 bushels of corn and 30,000 bales of cotton. The exports from all Atlantic ports last week were only 23,285 bushels, and of this 15,000 bushels went from Newport News to Brazil, and of the remainder only one load to the United Kingdom. This is the smallest export business within remembrance.

The exports of specie from this port during the week were $702,000, and the imports $111,000; total since January 1 $29,697,000 and $6,922,000 respectively, against $14,250,000 and $32,965,000 for the corresponding period last year.

Breadstuff exports during September aggregated in value $11,715,193, against $11,094,132 in September last year. Cotton exports amounted to 180,214 bales last month, valued at $8,814,672, or $5,000,000 less than in September, 1887. Mineral oil exports during September last aggregated in value $3,874,719, or about a quarter of a million less than in September, 1887.

The East Side Bank, at the junction of Grand and Division streets, has opened for business. The officers are Thomas R. Manners, president; Samuel B. Clark, vice-president, and James S. Oakley, cashier. It has a capital of $500,000.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from October 5 to October 12, inclusive, and from January 1 to October 12, inclusive, were as follows:

Iron and Steel.

	Oct. 5 to Oct. 12. Tons.	Jan. 1 to Oct. 12. Tons.
Pig Iron: Crocker Bros	735	10,097
W. H. Walbaum & Co	304	704
Merchants' Despatch	300	300
G. W. Stetson & Co	185	12,350
Naylor & Co	180	6,495
N. S. Bartlett	200	4,700
James Williamson & Co	100	4,500
Spiegeleisen: Crocker Bros	374	9,736
Dana & Co	85	3,488
Naylor & Co	10	9,128
Steel: Oelrichs & Co	100	100
Cary & Moen	50	114
Pierson & Co	45	120
W. F. Wagner	40	1,189
R. H. Wolff & Co	25	466
R. F. Downing & Co	16	200½
Ogden & Wallace	16	55
Chas. Hugill	8	249½
F. S. Pilditch	4	357
C. A. Walschid	5	5
J. Abbott & Co	5	469
C. F. Boker	4	193½
Steel Rods: Dana & Co	429	4,533
Naylor & Co	201	16,458
R. H. Wolff & Co	151	3,524
A. Heyn	122	1,411
J. A. Roebling's Sons	100	1,480
Steel Sheets: R. Crooks & Co	23	346
Steel Bloom Ends: Dana & Co.	103	1,128
Steel Billets: J. Abbott & Co.	112	1,638
Steel Rivet Rods: J. Abbott & Co	100	4,288
Steel Blooms: G. T. Carter	411	501
Steel Hoops: A. R. Whitney & Co	100	2,114
Steel Sheets: A. Milne & Co	5	57
Steel Wire: J. A. Roebling's Sons	5	180
Steel Tires: Naylor & Co	4	59½
Steel Scrolls: Ogden & Wallace	15	15
Swedish Steel Slabs: C. V. Philp	45	50
Swedish Rough Bars: C. V. Philp	75	245
Iron: J. Abbott & Co	5	6,821½
Iron Rivet Rods: G. Lundberg	52	510
J. Abbott & Co	51	4,239
Iron Girders: W. H. Wallace & Co	3	314
Iron Beams: Post, Martin & Co	45	62
Iron Pipes: J. S. Leng's Son & Co	3	3
Iron Wheels: R. F. Downing & Co	10	511
Iron Wire Rods: N. Lilienberg	100	590
Ferromanganese: C. L. Perkins	900	5,600
Charcoal Iron: Naylor & Co	165	665
Scrap Iron: Frothingham, Baylis & Co	248	248
Sheet Iron: T. B. Coddington & Co	61	1,249
Galvanized Iron Sheets: A. R. Whitney & Co	10	10
Wire Rods: S. A. Galpin	22	22
Cotton Ties: Naylor & Co	225	5,312
Bullard & W	175	1,645
Bar Iron: N Lilienberg	200	403

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co	18,727	456,569
Dickerson, Van Dusen & Co	12,442	328,799
T. B. Coddington & Co	5,750	138,149
A. A. Thomsen & Co	5,052	116,478
Pratt Mfg. Co	4,709	142,166
N. L. Cort & Co	3,259	89,525
R. Crooks & Co	1,805	57,928
Central Stamping Company	1,777	28,756
Bruce & Cook	1,435	81,136
Wolff & Roesing	1,222	22,618
G. B. Morewood & Co	1,000	39,945
S. Shepard & Co	935	18,533
Jas. Byrne & Son	890	31,486
C. S. Mersick & Co	810	6,116
Lombard, Ayres & Co	631	11,843
Consolidated F. Jar Co	517	2,014
E. S Wheeler & Co	451	6,709
N. S. Bartlett	200	200
H. R. Demilt & Co	188	16,549

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co	224,746	9,501,669
R. Crooks & Co	167,925	694,516
Hendricks Bros	114,699	482,154
Phelps, Dodge & Co	68,500	1,787,785
Mendel & T	38,129	38,129
D. Thomsen & Co	22,444	226,487
	Casks.	Casks.
Antimony: Phelps, Dodge & Co	50	550
American Metal Co	25	285

Irons and Metals Warehoused from October 5, to October 12, Inclusive:

	Pounds.
Lead: Schultz & Ruckgaber	440,111
Spelter: Lewisohn Bros	111,994

Hardware, Machinery, &c.

American Contracting and Dredging Company Old Mach'y, pcs., 22
Barbour Bros. & Co., Mach'y, pkgs., 21
Bernard, Geo., Ironwork, bdls., 44
Bittel, Tepel & Co., Mach'y, cs., 84
Boker, Hermann & Co., Arms, cs., 31
Curley, J. & Bro., Cutlery cs., 2
Downing, R. F. & Co., Chains, cks., 40
Folsom Arms Company, H. & D., Mdse., cs., 2
Field, Alfred & Co., Mdse., cs., 34
Foley, Edward, Mch'y, pkgs., 14
Garcia, J. B., Mach'y, pkgs., 2
Graef Cutlery Company, Cutlery, cs., 11
Hart, A. W. & Co., Winding Mach'y, cs., 3
Hartley & Graham, Arms, cs., 29
Irwin, Chas., Arms, cs., 18
Lau, J. H. & Co., Arms, cs., 14
Merchants' Despatch Co., Arms, cs., 6
Meyer, C. & Co., Mach'y Parts, pkgs., 38
Perez, Triano & Co., Steam Pump, box, 1
Schoverling, A., Arms, cs., 29
Shoverling, Daly & Gales, Arms., cs., 10
Taylor, Thos., Mdse., cs., 6
Wiebusch & Hilger, Lim., Arms, cs., 5; Anvils 316; Mdse., cs., 4
Order, Steel Shoes, 42; Mach'y, cs., 6

Exports of Metals.

	Oct. 5. to Oct. 12. Pounds.	Jan. to Oct. 12 Pounds
Copper: J. Abbott & Co	226,207	11,346,826
Lewisohn Bros	.....	3,029,022
F. A. Lomai	.....	2,581,293
American Metal Company	.....	5,629,902
G. H. Nichols	.....	223,939
J. Bruce Ismay	.....	112,000
S. Mendel	.....	560,000
Ledoux & Co	.....	110,276
Muller, Schall & Co	.....	430,000
Copper Queen Con. M. Company	.....	224,034
J. Kennedy, Tod & Co	.....	112,026
H. Becker & Co	.....	1,250
Orford C. & S. Rfg. Company	.....	449,881
Robt. M. Thompson	.....	125,000
Thos. J. Pope, Sons & Co	149,000	1,426,130
J. Parsons & Co	.....	420,000
Naylor & Co	56,200	448,809
Bridgeport Copper Company	.....	112,000
C. Herold	.....	250,000
Phelps Bros	.....	6,250
R. W. Jones	.....	189,984
Ladenburg, Thalmann & Co	.....	229,371
W. H. Crossman & Bro	.....	4,000
R. Crooks & Co	.....	1,000
Copper Matte: Williams & Terhune	434,540	34,817,138
Lewisohn Bros	.....	3,021,610
American Metal Company	485,541	3,114,643
J. Abbott & Co	.....	295,000
C. Ledoux & Co	.....	485,809
F. W. J. Hurst	.....	184,288
G. H. Nichols	.....	722,777
H. T. Nichols & Co	.....	180,995
Kunhardt & Co	.....	41,652
Spelter: Muller, Schall & Co	....	30,000
Copper Ore: John H. Starin	.....	28,000
Old Copper: Burgass & Co	15,820	600,633
	Tons.	Tons.
Pig Iron: Peter Wright & Sons	120	600

Coal Market.

The usual heavy autumn business having been largely anticipated by the pressure of orders early in the season, the Anthracite Coal trade just now is quiet, except for domestic sizes. Nevertheless deliveries from first hands are in large volume, taxing transportation facilities up to their full limit. No large amount of new business is reported—that is to say, sales at the latest schedule advance are not yet in any considerable amount—but "at one price or another," some of the companies have all they can do, the Reading, for example, being out of the market for the remainder of October, and some of the fancy brands are all sold up on account of the excessive demand. As to prices, it is commonly understood that the maximum has been reached. Broken is weak; the small Stove sizes continue in excessive supply, and Egg is being sold in Philadelphia below the circular. Some solicitude is expressed lest the market become weighted by heavy production. Quotations are as follows: Hard White Ash, Broken, $4.15; Egg, $4.40; Stove, $4.65; Chestnut, $4.55; Fine White Ash, Broken,

$3.95; Egg, $4.30; Stove, $4.65; Chestnut, $4.55.

Production at the mines shows some increase compared with the previous week, but is below the average for some time past. The total for the week ending October 13 is 836,054, as compared with 693,519 tons for the corresponding week last year; increase, 142,500 tons. Since January 1 the total is 29,308,052 tons, against 26,791,814 for the same time in 1887; increase, about 2,500,000 tons.

The Bituminous Coal trade is active and firm at pool prices, the demand being fully equal to the supply. Respecting efforts to harmonize differences in the Seaboard Association, the Philadelphia *Ledger* says: That while no definite arrangements for a renewal of the association were concluded at the meeting held in that city last week, "the representatives of the several districts present agreed to make no contracts for Soft Coal for delivery next year at any price pending the reorganization of the pool, and until the Beech Creek and other interests can be heard from. Another meeting will be held at an early date, to which, it is expected, all the Soft Coal mining interests east of the Alleghenies, from the Pocahontas district north to the Beech Creek, will send a representative."

The Cumberland region reports a tonnage during the week ending October 6 of 73,959 tons, and for the year 2,727,000 tons, as compared with 2,451,000 tons in 1887. The Clearfield production was 70,000 for the week, and for the year 2,598,000, against 2,451,000 in 1887. The stock of Anthracite Coal at tidewater points on September 29 was 370,811 tons, against 396,752 tons on August 31 and 394,748 tons September 30, 1887.

The Lehigh Valley recently ordered 2000 gondola cars, which will be used partly in the Western Coal-carrying trade. The cars will be built in Catasauqua.

The Western New York and Pennsylvania Railroad has just received 1000 new cars, and directors say 1500 more are needed to handle the company's Coal business into Buffalo. The Jersey Central Road is steadily striving to effect a short and direct route from the Pennsylvania Coal fields to New England by way of the Poughkeepsie Bridge. The long pending suits respecting the posession of valuable Coal lands in Sugar Loaf and Black Creek townships, Pa., between C. M. Derringer and Eckley B. Coxe have been settled by mutual concessions. It is said that the concession made an equal division of their interests.

British Iron and Metal Markets.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, Oct. 17, 1888.

It is stated, on apparently good authority, that the negotiations alluded to last week as pending between the French syndicate and the principal mining companies for the control of supplies for a period of nine years have been suspended. The reason for this is not stated. Speculation in Copper has been very moderate during the week. The syndicate holds prices very steady, but makes no efforts to bring about any advance, probably because of there being no great outstanding "short" interest in the market. Purchases by consumers have been comparatively light.

Speculation in Block Tin has been slow. Supplies here are well under control and the statistical position generally is strong, but buyers are comparatively few and extremely cautious. The market, however, is looking stronger to-day than at any previous time the last fortnight.

The Pig Iron market has changed slightly for the better, mainly in sympathy with a reaction of 1/ on warrants. Speculation is hesitant at the moment, however, and purchases for consumption and export are barely of average volume. On makers' brands of Scotch Pig there has been only slight fluctuations. Hematites have also been without important change, but Cleveland Pig is a shade higher.

Tin plate has been in limited demand, and the condition of the market is practically the same as it was a week ago. At the quarterly meetings continued firmness in prices was reflected.

Tinned and Stamping Sheets have been advanced a sovereign.

The Trevor Plate Company have started up a second mill.

The Steel trade, as a whole, continues brisk and new orders of considerable size are reported in several branches. Bolckow, Vaughan & Co. have booked orders for 40,000 tons Steel Rails, about one-half of which are for South America. The Glasgow Iron Company have secured an order from the States for 1000 tons, and refused to fill a second order for 1500 tons, except at an advance.

Scotch Pig.—There has been a more active business, without, however, material change in prices.

No. 1 Coltness,	f.o.b.	Glasgow	49/6
No. 1 Summerlee,	"	"	51/
No. 1 Gartsherrie,	"	"	47/3
No. 1 Langloan,	"	"	48/9
No. 1 Carnbroe,	"	"	43/
No. 1 Shotts,	"	at Leith	48/6
No. 1 Glengarnock,	"	Ardrossan	47/6
No. 1 Dalmellington,	"	"	42/6
No. 1 Eglinton,	"	"	41/6

Steamer freights, Glasgow to New York, 7/ Liverpool to New York, 10/.

Cleveland Pig.—Makers firmer on prices, but business only fair. No. 1 Middlesboro', G.M.B., 37/6; No. 3 do., 35/.

Bessemer Pig.—Business has been large and prices show more firmness. West Coast brands, mixed numbers, 44/6, f.o.b. shipping point.

Spiegeleisen.—The demand is fairly active and the market very firm. English 20% quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—There has been a large business and the market is firm. Standard sections quoted at £3. 18/9, f.o.b. at N. W. England shipping point.

Steel Blooms.—Demand continues good and prices remain firm. We quote £4. 2/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—A fairly active business and prices firmer. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Very little doing, but prices held firmly. Bessemer, £4. 1/3, f.o.b. at N. W. England shipping point

Steel Wire Rods.—The market and prices unchanged. Mild Steel No. 6 quoted at £5. 19/6 and No. 5 at £5. 18/6, f.o.b. at N. W. England shipping point.

Manufactured Iron.—Bessemer continues brisk. Prices are strong, with an advance on Sheets and Welsh Bars. We quote, f.o.b. Liverpool:

	£	s.	d.		£	s.	d.
Staff. Ord. Marked Bars....	....			@	8	2	6
" Common "	....			@	5	5	0
Staff. Bl'k Sheet, singles.....				@	7	10	0
Welsh Bars (f.o.b. Wales)...	4	17	6	@	5	0	0

Tin Plate.—No change of importance in the market. Business fair. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/6 @ 16/
IC Bessemer steel, Coke finish...	14/3 @ 14/6
IC Siemens " " "	14/6 @ 14/9
IC Coke, B. V. grade.....	14/ @ 14/3
Charcoal Terne, Dean grade..	12/6 @ 13/

Tin.—The market stronger and more active after ruling duller. Straits quoted at £101. 10/, spot, and £102 @ £102. 10/ for three months' futures.

Old Rails.—Demand rather slow, and the market not so firm. Tees quoted at £2. 17/6, and Double Heads £3, f.o.b.

Scrap Iron.—Moderate sales at barely steady prices. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Crop Ends.—The market quiet and unchanged. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Copper.—Only a moderate business, and no material change in values. Chili Bars, £78. 10/, spot, and £78, three months' futures. Best Selected, £81. 10/.

Lead.—The market quiet and barely steady. Soft Spanish, £14. 7/6.

Spelter.—Demand has slackened and prices are weaker. Silesian, ordinary, £18. 12/6.

Metal Market.

Copper.—London declined with Spot and Chili Bars since our last report from £82 to £78. 10/, and Futures from £78. 10/ to £78; while good Merchantable Brands improved from £77. 5/ to £77. 10/; Best Selected remaining £82. Total London sales, 575 tons. The visible supply in England and France decreased from 89,154 tons on October 1 to 87,233 tons on October 16. The stock of Chili Bars at Liverpool and Swansea is cabled this morning as being 26,857 tons. Import of American Copper into Liverpool and South Wales, 9 months, 19,198 tons, against 8937 in 1887. Our market has been utterly stagnant on the Metal Exchange at nominally 17.40¢ @ 17.45¢ for October. It is now asserted that the syndicate contracts with the mining companies have been renewed, extending them to six years with a small restriction in production, and an advance of ½¢ in the contract price. The Calumet and Hecla under this extended contract will be limited to 50,000,000 ℔ annum. It is stated, to-day, that to restrict production is illegal in this country. Messrs. James Lewis & Son-Liverpool, October, say about good merchantable brands that Chili Bars will soon probably be merged into the former, for forward delivery, so as to prevent the recurrence of a corner in Chili Bars.

Tin.—There has been an improvement in spot Tin in London since we last reported, from £100. 15/ to 101. 12/6, and in futures from £101 to £102. 5/, the sales summing up 580 tons. Our own market has been dull and irregular, total sales not exceeding 90 tons at 23½¢ spot, and October to December, 22.80¢ to 23.15¢. The improvement in the London market is due, it is stated, to an improving statistical position. *Tin Plates.*—A moderate demand has prevailed for Tin Plates on the spot, with a slight shading on Charcoal finish and Wasters. Futures have been neglected, because they are considered held too high. At Liverpool small lots can be had a little lower, but large lines are held at 13/6 for Cokes. We quote to-day, at the close, for large lines on the spot, Siemens-Martin Steel, Charcoal finish, $5.20 @ $5.75; Coke finish, $4.70; Ternes, $4.25 @ $4.35; Bessemer Cokes, $4.50 @ $4.55, and Wasters, $4.25.

Lead.—Hardly anything has been done in the open market, and that little on

private terms, the present spot price being 4.80¢. On 'Change altogether 880 tons changed hands. On Thursday the price suddenly dropped to 4.65¢, then rose to 4.97½¢, but subsequently closed at 4.80¢. the Western markets have remained uninfluenced by the weakness here, ruling at 4.90¢ to 5¢. Soft Spanish has been steady in London at £14. 7/6 and English Pig at £14. 12/6. To-day 350 tons were sold, including October up to 4.90¢, November at 4.75¢ and January at 4.25¢. The market closes with 4.62½¢ bid and 4.85¢ asked.

Spelter—Has not displayed much life on the spot, yet Common Domestic continues to be firmly held at 5¼¢, while Silesian remains nominally 6¢ @ 6.05¢. London has given way with Silesian from £19 to £18. 12/6.

Antimony.—A firm tone has prevailed, with a fair consumptive demand at 12½¢ @ 12¾¢ for Cookson, and 10½¢ for Hallett, the latter meanwhile declining in London from £42 to £41.

New York Metal Exchange.

The following sales are reported:

FRIDAY, October 12.

10 tons Tin, October	22.70¢
10 tons Tin, October	22.60¢
10 tons Tin, October	22.75¢
20 tons Tin, October	22.85¢
248 tons Lead, October	4.90¢
16 tons Lead, October	4.92½¢
16 tons Lead, November	4.80¢
32 tons Lead, November	4.85¢

SATURDAY, October 13.

16 tons Lead, October	4.92½¢
48 tons Lead, spot	4.95¢
66 tons Lead, October	4.95¢
98 tons Lead, October	4.97½¢
32 tons Lead, October	5.00¢
48 tons Lead, November	4.80¢

MONDAY, October 15.

64 tons Lead, November	4.85¢
50 tons Lead, October	4.97½¢
20 tons Tin, October	22.85¢

TUESDAY, October 16.

30 tons Tin, November	22.80¢
10 tons Tin, December	22.80¢
100 tons Lead, November	4.80¢
32 tons Lead, November	4.82½¢

WEDNESDAY, October 17

10 tons Tin, November	23.05¢
10 tons Tin, December	23.05¢
25 tons Tin, November	23.15¢
100 tons Lead, January	4.25¢
16 tons Lead, October	4.70¢
80 tons Lead, October	4.75¢
32 tons Lead, October	4.90¢
115 tons Lead, November	4.75¢

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira	19.3
Florin (Netherlands)	40.2
Florin (Austria)	35.9
Milreis (Portugal)	$1.08.
Milreis (Brazil)	54.6
Mark (Germany)	23.8
	Pounds.
Kilogram	2.205
Picul	134.

BRAZIL.

PARA, October 12, 1888.—*India Rubber.*—The market remains firmly sustained; there were shipped to New York, so far this month, only 171 tons by one steamer.—*Per cable direct.*

WEST INDIES.

PORT OF SPAIN, TRINIDAD, September 14, 1888.—*Asphaltum.*—There has been a steady, moderate demand, at $14.04 ℔ ton for boiled, and $6.84 crude, f.o.b., including export duty. Shipments since January 1 aggregate 40,277 tons, against 31,426 same time last year and 25,885 in 1886. *Exchange*, 90 days, on London, $4.80 @ $4.86.—*E. P. Masson.*

CHILI.

VALPARAISO, August 23, 1888.—*Copper*—Has been so sparingly offered that sales were restricted to 7749 quintals during the fortnight, at $29.45 @ $30; $29.45 equals £75. 10/6, f.o.b., with 27/ steam freight. No Copper can be had before the middle of October. *Nitrate.*—There has been an advance from $2.72½, 95 %, to $2.87½, $2.90 being the asking price at the close; sales reached 1,500,000 quintals, of which 1,054,000 were 95 %, and 446,000 96 %; $2.80 equals 8/7½ ℔ cwt. and 28/9 freight to England. *Coal.*—The many arrivals of Coal from Newcastle have depressed the market to 32/6, while July sail is held at 35/ in consequence of the rise in freights in England. *Exchange* has been pressed on the market, owing to the large Nitrate shipments, 90 days' on London giving way to 26¼d.—*Weber & Co.*

EAST INDIES.

PENANG, August 31, 1888.—*Tin.*—The receipts reached 11,000 piculs, of which Europeans took 5000 and Chinese 5000. Opening at $36 ℔ picul, Tin gave way temporarily to $34.90, but soon recovered the difference. Since January 1 there have been shipped to England 97,339 piculs, against 102,480 in 1887 and 98,704 in 1886; to the Continent, 338, against 2029 and 1630, and to the United States, 7374, against 13,890 and 32,798. *Exchange*, 4 months' bank, 3/1½.—*Schmidt, Kustermann & Co.*

MANILA, October 8, 1888.—*Hemp.*—At $10.62½ ℔ picul there continue buyers, against 89 same time last year, equaling respectively ℔ ton, cost and freight, £35. 17/6 and £32. 10/. Clearances for the United States since last cable amounted to 5000 bales, against 17,000 in 1887; since January 1 they reach 152,000, against 171,000; there remain loading for that destination 47,000, against 51,000. Cleared for England since January 1, 261,000 bales, against 162,000; loading for do., 5000, against 6000; cleared for all other ports, 57,000, against 30,000; receipts at all ports since last cable, 13,000, against 11,000, and since January 1, 482,000, against 391,000 and 311,000. *Freight*, $6, against $5, and *Exchange*, six months' sight drafts, 3/6, against 3/5⅝.—*Ker & Co. to Charles Nordhaus, 89 Water street, New York.*

HOLLAND.

ROTTERDAM, October 3, 1888.—*Copper.*—In accordance with the plan of reorganization submitted to the shareholders at the recent general meeting, the Peninsular Copper Company have been remodeled and a new company formed called the Consolidated Peninsular Copper Company, to be domiciled at Amsterdam, with a share capital of 7,000,000 guilders, 16,667 shares of 240 guilders and 25,000 at 120, to be offered for sale in Amsterdam, London, Paris and Berlin. *Tin.*—Following are the Netherland statistics for September:

Banca.

	1888. Aug. 31. Slabs.	1888. Sept. 30. Slabs.	1887. Sept. 30. Slabs.
Stock on warrants with the Netherland Trading Company	20,108	32,700	28,490
Billiton stock here and at Amsterdam	13,468	18,662	17,012
Total	33,576	51,362	45,502
Banca deliveries in September	11,746	9,325	11,071
Billiton deliveries in September	8,375	5,650	5,221
Total	20,121	14,975	16,292
Banca deliveries since January 1.	92,592	101,917	107,672
Billiton deliveries since January. 1..	59,186	64,836	70,758
Banca afloat	4,000	8,200	3,880
Company's Banca reserve for future auctions	126,928	113,361	60,855
Billiton afloat	46,000	31,500	35,961
Quotations:			
Banca, fl	58¾	63¼	63½
Billiton, fl	57½	62¼	63½

Since the 1st inst. Banca has ruled at 63 guilders ℔ 50 kg.—*Koch & Vlierboom.*

GERMANY.

HAMBURG, October 6, 1888.—*Iron.*—There has been a growing inquiry in Rhenish-Westphalia during the week for both Pig and Finished, giving rise to the impression that the paralysis is at an end. Several large orders for Spiegel have been executed for American account, one for 20 % Manganese for 10,000 tons, and one for 10 to 12 % for 5000 tons; negotiations are going on for additional lines for the same quarter. Although these Spiegel shipments to the United States do not yet come up to what they were in 1887, a continuation of them would probably cause an improvement. For the moment 10 to 12 % does not bring over 53. But for Luxembourg underselling German makers, other Pig Iron would be higher and brisker than it is. Siegen is selling Forge Pig at 47 @ 48. Foundry Pig has remained steady, and so have both Bessemer and Thomas; the latter more and more supersedes Bessemer. White Luxembourg may be quoted 37.50; Gray, 42; English, 42. The domestic demand for Finished is decidedly livelier, but there is no stir in the export trade. Hoop Iron sells with greater ease in the home market; Beams continue lively, and so do Boiler Plates; Thin Sheets are doing better. Steel works are busy throughout, and so are the Car works; the Wire branch is quiet and steady. The quotation for Merchant is 125 @ 127.50; Bessemer Steel Billets, 135; Steel Rails, 120; do. for mines, 115. Prospects for a renewal of the International Steel Rail Syndicate are the reverse of encouraging just at present. In Upper Silesia 28 furnaces are in blast, 23 for own use and 5 operating for the general market, the weekly output being 8500 tons. Works generally are loaded down with orders, so that all Iron branches are in a flourishing condition, the chief demand for the export of Finished coming from Roumania, Bulgaria, Servia and Denmark. There are even orders from Russia. The demand extends to Wire Nails, owing to the activity in the building branch this fall. *Metals.*—Lead continues tending upward, Hartz Lead bringing 15 marks in this city. Both Copper and Spelter remain firm.—*Borsenhalle.*

The Electric Light in the Navy.

The electric light has been very prominent during the recent British naval maneuvers, and although accounts somewhat differ as to its actual value, there can be no doubt that it is one of the indispensable adjuncts to a modern man-of-war One of the English electrical journals, while on this subject, remarks that some complaints have been made that the lookout men are so dazzled by the beam that they are unable to keep as sharp a watch as is necessary in directions which are not at the moment illuminated. On the other hand, this dazzling effect was turned to a good use during the naval maneuvers of last year, when the gunners manning the guns in the Pembroke Dock forts were rendered almost blind every now and again by the attacking ships skillfully flashing the light full in their faces, and during the interval of darkness moving rapidly to another point. This year Admiral Tryon made clever use of the electric light in a manner which recalls a somewhat similar use made by the French in their attack on Sfax. Unable to approach the forts near enough to deliver an effective fire, the French admiral placed his Hotchkiss quick-firing shell-guns on board his small boats, and as soon as it was dark sent them to attack the enemy at close quarters. He then threw the strongest possible light upon the forts, and the small boats, moving ahead in the darkness just beyond the flashes of light, came in close to the forts and poured in a deadly fire. The defenders, completely bewildered, capitulated soon after daylight.

A Hydrostatic Balance.—A hydrostatic balance, invented by Mr. John Joly, was exhibited at the recent meeting of the British Association. In a case about a foot high there is suspended a brass ball containing water, inside which floats a smaller ball. From this latter a wire passes through a nozzle in the outer vessel down to two scale pans, arranged one above the other. One scale pan would, of course, suffice. The balance weighs any quantity up to 164 grams accurately to within 1 or 2 mg. It can be made very cheaply and is independent of temperature and consequent expansion unless water be placed in the ball and air admitted To prevent this a small chamber is placed round the nozzle through which the wire passes, into which dips a little stem from the sphere. This arrangement resembles a U with one very narrow and one wide limb, the latter one corresponding to the orifice in the vessel through which the wire passes, and the displacement would first occur in the finer tube. The surface tension of the liquid prevents any direct leakage of water. If perfect compensation be aimed at the outside vessel might be made of tin, the inside of iron. The hope was expressed that accurate and large balances will be made at a very small cost on this principle.

Engineering News has just published the first of a series of statistical reports on the water works of the United States, beginning with New England. The States in that group have 287 water works, with 5291 miles of mains, the capital invested being $84,993,000.

Hardware.

There is little change in the situation, prices remaining without alteration and the demand being fair. The complaints that trade is in a measure disappointing are made in some quarters, but the volume of business is generally regarded as pretty satisfactory.

Barb Wire.

The market is not characterized by special strength, and business is moderate in volume. Carload lots of Four-Point Galvanized are quoted here at 3.6 cents, with the usual advance for small lots.

Cut Nails.

The market is quiet, with a moderate amount of business doing. Prices continue unchanged at $1.85 for carload lots of Iron Nails on dock, and $1.90 @ $1.95 for small lots from store.

Wire Nails.

The condition of the market in this line is regarded as exceptionally satisfactory, the Western Association having completed its organization, with provisions to secure the maintenance of prices, and including as it now does all the leading Western manufacturers. At the meeting of the Eastern Association, held last week, the matter of an advance in prices was broached and suggested to the Western Association, but the result of the action remains to be seen. Quotations remain $2.55 for carload lots and $2.65 for small lots, and those quotations are held with regularity, except that in a few instances slight concessions are made beyond the prices given for small lots. The exceptionally large stocks of Nails held by the trade have some influence in the market, as the Nails can in many cases be bought from second hands at lower figures than from the manufacturers.

Miscellaneous Prices.

The price of both Manila and Sisal Rope remains without change. The fact that the Hemp of both kinds is firm in price gives a strength to the manufactured product, and it is thought not unlikely that an advance will soon be made.

The prices for Market Wire remain unchanged except that some exceptionally low quotations are no longer within the reach of buyers. The demand is referred to as light.

W. G. Avery Mfg. Company, Cleveland, Ohio, quote their Combined Saw-Set and Punch, their Bevel and Square and their Bevel Protractor Square at discount 40 per cent.

Trade Topics.

From a well-known Hardwareman in Texas we have the following incident, which was suggested by a recent article in this paper:

Referring to the article in your issue, 27th of September, on the art of selling, it reminded me that one time I was selling a small boy a 10-cent Pocket Knife. I was alone in the store at the time, when a man came in and wanted to buy a Wagon worth $80. I invited him to take a seat until I was through with the boy. He remarked that if I would not drop a 10-cent sale to sell him a Wagon he would go elsewhere. I called his attention to the fact that at one time he was a small boy, and probably a 10-cent Knife was as much to him then as the Wagon now. He quickly and quietly took a seat until the boy bought the Knife and was gone. I was then at his service, and in a short time sold him the Wagon, and he left in a happy mood.

Our advices from Louisville, under date of the 13th inst., are as follows:

The Hardware trade of Louisville, Ky., has been good but quiet, a fair volume having been transacted. The Southern trade is still terribly depressed, with a few straggling orders coming from the unfortunate sections. Many salesmen have gone into the Southwest with the idea of working back through the infected districts after frost makes its appearance. Bar Iron is in fair demand and holding firm at $1.75 from store. Light Sheet is very scarce and sells readily at $3.50 for No. 27 in jobbing lots. This advance is caused by the inability of the mills to fill orders. No one would have supposed that there were too few Sheet mills in the country, but such seems to be the case. For No. 27 there never was such a pressing demand on the jobbers, who, in turn, are urgent for prompt shipments from the mills, yet meeting with very little success; stocks are almost completely exhausted. Wire Nails are holding firm, a new advance having been ordered by the association. Dealers are getting suspicious of the danger line being reached, and a break resulting. The demand, although fair, will not stand much further tension. Cut Nails have again dropped. The action of the mills in association does more harm than good; they meet and resolve to sell only at certain prices and entice dealers to buy heavily, when down drops the bottom, and all confidence is destroyed. History repeats itself very fast in this instance. The Axle manufacturers have resolved that orders are getting scarce, and are throwing out fresh inducements to their friends, the big jobbers.

Items.

Freeman Wire Company, St. Louis, Mo., have in the hands of the printer a handsome catalogue, which will contain copious illustrations of the different styles of specialties which they are manufacturing.

Wells Bros. & Co., Greenfield, Mass., issue a supplement to their catalogue, in which descriptions are given of their Little Giant Combined Drill Holder and Countersink, their Farriers' Tool Box and Vise Bolt Grip and Wheel-Holding Attachment.

The Phœnix Wire Works, Detroit, Mich., are issuing their autumn catalogue, which shows a varied line of Counter and Office Railings, Iron Crestings or Roof Railings, Wire-Cloth Flower Stands, Screens, Nettings and miscellaneous goods.

The Meriam & Morgan Paraffine Company, Cleveland, Ohio, issue a price list relating to their manufactures, including, among other things, the Paragon Axle Grease.

By the special notice on page 51 it will be seen that Haydock & Bissell will sell at auction at the store, No. 86 John street, New York, the entire stock of the Benton & King Company on Wednesday and Thursday of next week. The sale will comprise in part an assortment of machinists' Bolts and Nuts, Brass Valves, Steam and Service Cocks, Gas Fitters' Tools, &c., and general Engineer's Supplies. Further particulars may be learned from the advertisement.

The Goulds Mfg. Company, Seneca Falls, N. Y., announce that Chaales L. Zacharie, who has been with them for many years, will hereafter be associated in the management of their salesroom at 60 Barclay street, New York.

Horton Mfg. Company, Fort Wayne, Ind., issue an effective advertising hanger, illustrating their Western Washer in attractive style.

Dightson & Co., wholesale and retail hardware merchants, at West Superior, Wis., are reported to have made an assignment for the benefit of their creditors on the 11th inst. Their assets are reported at $20,000 and liabilities at $35,000. Among their creditors are firms at Chicago, Milwaukee and Detroit.

In calling attention to their Standard Reference Disks the Brown & Sharpe Mfg. Company, Providence, R. I., send out not only a circular in which the goods are described and prices given, but they also issue a miniature pamphlet in which the characteristics and advantages of the Standard Reference Disks are pointed out. These pamphlets are evidently intended for distribution among mechanics who have use for the goods, and we call special attention to this method of bringing them to their attention, as it may suggest to other manufacturers the adoption of similar expedient. We reproduce below one of the pages full size:

> When a Gauge or Caliper has been long in use, the question arises whether constant service has impaired its accuracy. In deciding this question, Standard Reference Disks are of use. They are also useful for other

It will be conceded that the use of such advertising matter tastefully and judiciously gotten up and well distributed, would be an important aid to the retail merchants in effecting sales for Hardware. In cases where this simple expedient is resorted to it has been, we believe, attended with the best success.

Our readers will observe the advertisement of the Henry C. Hart Mfg. Company, Detroit, Mich., page 52, referring to their specialties for the Toy trade, including a line of Toy Banks, one of which is illustrated and the names of others given. All of these Banks are stated to have Combination Locks except the Cash Register Bank, of which we recently gave a description.

Brooklyn Wire Nail Company, 17 Broadway, New York, have prepared a unique and interesting Lead Pencil, which they are sending out to their customers. It is in the form of a finely finished 20-penny Wire Nail.

The Harrington & King Perforating Company, 224 and 226 North Union street, Chicago, received a letter on the 13th inst., mailed on the 1st of August, from a correspondent in Loeboe Samperie, Padang, Sumatra, West, Dutch East Indies, giving them quite a large order for perforated metals for separating coffee. The correspondent also ordered some general coffee machinery and a number of articles in the line of general hardware. He stated that he had seen the advertisements of these articles in *The Iron Age*, to which he was also indebted for much information about machinery. The letter also said that the planters of that district preferred to patronize American manufacturers, finding them usually very reliable and their goods and machinery of high quality, which could not be said for the manufacturers of other countries. In shipping these goods the route followed is via New York, Amsterdam, and the Suez Canal, by the Netherland Steamship Company. The Harrington & King Perforating Company inform us that they have a very large foreign trade in their perforated metals, which is traceable to a considerable extent to their advertisements in *The Iron Age*.

Result of the Cipher Competition.

There were 91 lists of ten-letter words received in the David Williams cipher competition. Of these 88 were received before the hour fixed for closing the contest, while 3 were received after that hour. The longest list was sent in by C. F. Rood, of Grand Rapids, Mich., aggregating by actual count 1153 words. This was reduced by the Committee of Award to 1065. The second longest list came from A. Israel, of Buffalo, N. Y., being by count 1146 words, which the scrutiny of the committee reduced to 996. The third list came from Sam Holder, of Bloomington, Ill., counting 1082 words, but being similarly reduced by the examination of the Committee to 974 words.

The prizes, therefore, by the terms of the contest go as follows: First prize, $15, to C. F. Rood, of Grand Rapids, Mich.; second prize, $10, to A. Israel, of Buffalo, N. Y. In view of the close competition between the last two competitors named, it has been decided to add another prize, and therefore the third prize of $10 is awarded to Sam Holder, of Bloomington, Ill.

The three contestants named above, as will be seen by the list published below, distanced all their competitors, the next highest lists being in the eight hundreds. In the list of contestants we indicate the order in which the papers were opened by the committee, and append the number of words sent in by each, by actual count. It will be noticed that the number of lists ranging from 500 to 700 words is far the larger number. This, we think, will be a surprise to the reader, for very few, we imagine, who have not given personal examination to the subject, would suppose there were even 300 words of the kind specified in the contest. A number of ladies, wives and daughters of subscribers took part in the contest. The geographical distribution of the names, it will be observed, is very general, a very large proportion of the United States being covered, as well as Canada. The following is the list of names and addresses of the competitors, initials or *nom de plumes* being inserted in cases where we have been requested not to publish the names:

LIST OF CIPHER COMPETITORS.

1	"C. S. C.," Oakdale, Neb.	823
2	J. H. Robbins, Keokuk, Iowa	667
3	A. Israel, Buffalo, N. Y.	1146
4	Geo. H. Altvater, Renova, Pa.	485
6	A. A. Whitenack, Somerville, N.J.	617
7	C. F. Rood, Grand Rapids, Mich.	1153
8	Fred. N. Parks, Norwich, N. Y.	628
9	Sam Holder, Bloomington, Ill.	1082
10	W. R. Tilton, Prairie Depot	122
11	Mrs. Gerrit Smith, Wellsburg, W. Va.	127
12	William Smith, Ontario, Can.	314
13	S. A. Partridge, Mobile, Ala.	322
14	"B. H. L.," Creston, Iowa	664
15	Jos. E. Anderson, Alliance, Neb.	585
16	Geo. H. Ferris, Hicksville, Ohio.	652
17	Charles E. Bodley, Creston, Iowa.	650
18	J. Q. Donnald, Lowndesville, S. C.	113
19	E. W. Porter, Chambers st., N. Y.	130
20	F. W. Burnham, Hartford, Conn.	313
21	Frank Sausser, Anderson, Ind.	166
22	Emma Gruber, Oshkosh, Wis.	300
23	J. T. Norton, Winsted, Conn.	225
24	Theo. W. Budelmann, Brooklyn.	300
25	C. E. Montgomery, Hoxie, Kan.	881
26	D. S. Gardner, Youngstown, Ohio.	731
27	"W. L. E.," Petersburg, Ill.	113
28	John L. Kerr, Montreal, Can.	200
29	Alphonso Smith, Milford, Conn.	627
30	F. Kansteiner, Hannibal, Md.	46
31	R. F. Richards, Chambers st., N.Y. City	658
32	Mrs. A. K. F. McGibbon, Susquehanna, Pa.	112
33	"M. E. J.," Baltimore, Md.	101
34	E. S. Bond, Florence, Mass.	803
35	"J. T. B.," Albany, N. Y.	678
36	Miss Ollie Car, Chicago, Ill.	667
37	Henry C. Wing, Greenfield, Mass.	213
38	Murrel De France, Willsburg, W. Virginia	41
39	E. S. Ramsey, Colby, Kan.	104
40	O. C. Marsh, Greenwich, Ohio.	738
41	J. R. Vincenty, Syracuse, N. Y.	782
42	"Bill J. Pie," Bristolville, Ohio.	735
43	"W. K.," Johnstown, Pa.	134
44	Otto Praeger, San Antonio, Tex.	263
45	Otto C. Ahlers, Bellevue, Iowa.	129
46	Charles Griebeling, Newton, Iowa.	276
47	"R. C.," Buffalo, N. Y.	745
48	T. A. High, Havana, Ill.	168
49	David R. Williams, Mobile, Ala.	124
50	Walter W. Bennett, Gananoque, Canada	58
51	"P. L. R.," Philadelphia, Pa.	164
52	"A. F. S.," Keokuk, Iowa.	669
53	J. C. Bold, Glasgow, Ky.	259
54	W. J. Beckley, Ravenna, Ohio.	82
55	T. H. Davis, Davenport, Iowa.	688
56	O. P. Wheeler, Buffalo, N. Y.	317
57	E. C. George, Plymouth, N. H.	163
58	Joe Young, Bellevue, Pa.	101
59	R. E. Mallery, Attica, Ohio	43
60	T. E. Enos, Waverly, N. Y.	20
61	J. C. Barnes, Strawberry Point, Ia.	345
62	"K. W. J.," Philadelphia, Pa.	48
63	I. F. Moore, Bridgeport, Conn.	557
64	F. A. Smith, Flora, Ind.	231
65	J. C. LeBean, Grand Forks, D. T.	127
66	"Retail Hardware," Phila., Pa.	324
67	L. Daniel Mehring, Littlestown, Pa.	523
68	H. A. Uehren, Galena, Ill.	240
69	"K. E. G.," Norcrop, Ga.	374
70	"B. E. A.," Eufaula, Ala.	636
71	C. A. Marker, Birmingham, Ala.	556
72	Charles W. Brown, South Fifth avenue, New York	43
73	Jos. M. Ellis, Dallas, Tex.	131
74	G. W. Battley, Jr., Norfolk, Va.	362
75	W. N. Badger, Burlington, Vt.	546
76	H. H. Swink, Temple, Tex.	724
77	W. H. Elliott, Chicago, Ill.	551
78	"H. D. E.," Malone, N. Y.	182
79	Henry W. Moyer, Campden, Ont.	552
80	Mary Slifer, Tarrytown, Md.	504
81	Linda M. Bogardus, Mt. Vernon, O.	570
82	John Lehr, Cleveland, Ohio	660
83	James Holden, Scranton, Pa.	150
84	J. A. Pitkin, Kalamazoo, Mich.	625
85	William Uhle, Cleveland, Ohio.	607
86	Pauline Orrick, Canton, Miss.	536
87	Madeline Orrick, " "	514
88	Mrs. C. H. Dickinson, Kalamazoo, Mich.	635

The following came to hand after the closing hour:

89	H. V. Jones, Newtonville, Mass.	682
90	"D. C.," Johnstown, Pa.	134
91	George W. Trout, Maquoketa, Iowa	719

Sargent & Co.,

New York and New Haven, Conn., issue a neat catalogue devoted to Carriage and Harness Hardware, in which 40 pages are used in exhibiting this line. It is accompanied by the following discount sheet, which is subject to an extra discount of 10 per cent. for prompt cash:

	Discount Per Cent.
Harness Hooks	60
Store Rack Hooks	60
Baggage or Harness Hooks	60
Hitching Rings	66⅔
Hitching Hooks and Rings	66⅔
Hitching Post Caps	80
Hitching Post Rods	65
Rein Chains	66⅔
Breast Chains	66⅔
Halter Chains	66⅔
Hitching Chains	66⅔
Shaw Patent Slide-Lock Snaps	55
Patent Double-Lock Snaps	55
German Pattern Snaps	33⅓
Sargent's Patent Snaps	70&10
Cock-Eye Snaps	70
Covered Spring Snaps	60&10
Covered Spring Snaps (Change list of No. 161 to $14)	60&10
Open Spring Snaps	60&10
Cattle Ties, Nos. 5 and 1	60
" " No. 4	66⅔
Halter Trimmings or Cattle Ties	66⅔
Rope Halter Leads	55
Rope Horse and Cattle Ties	55
Hitching Halters	55
Bull Rings, Nos. 10 to 22	66⅔
" " No. 25	60
Bull Snaps	66⅔
Cattle Leaders	66⅔
Ox Bow Pins, Nos. 71 and 72	60
" " " No. 82	66⅔
White Metal Mane Combs	50
Carriage Knobs	60
Sheep and Cow Bells	60
Cow Bells, Kentucky and Western	70
Brass Ox Balls	55
Prize Ox Balls (Bronze Metal)	55
Carriage Makers' Clamps	70
Cabinet Makers' "	66⅔
Bench Vises	60&10
Swivel Bench Vises	60&10
Appleton's Washer Cutters	60
Saddlers' Punches	55
Spring Punches	50
Empire Lace Cutters	33⅓
Shoe Knives	6
Harness Rings	25
Cock Eyes	40
Triple Tongue Chime Bells	60&5
Tinned Rivets and Burs	40&7½
Copper " " "	40&7½
Rivet Sets	50
Lining Nails, Japanned	35
" " Silvered	45
No. 1, Saddle Nails, Japanned	30
No. 1, " " Silvered	40
Furniture Nails	20
China Nails and Disks	40&7½
Gaston's Prestoline	20
German Coil Chain	55
" Cow Ties	40
" Halter Chains	55
Maydole's Farriers' Hammers	16⅔
Heller & Bros'. Farriers' Hammers	33⅓
Heller's Horse Rasps	50
Nicholson's Horse Rasps	60
Martin's Horse Clippers	25
Wostenholm's Farriers' Knives	Net
Blacksmiths' Butterises	75
Hoof Nippers	60
Horse Shoeing Pincers, No. 52	60&10
" " " No. 62	60&10
" " " No. 72	60
Blacksmiths' Tongs	75
Curry Combs	55
Perfect Curry Combs	40&7½
Rubber "	20
Horse Cards	10

Ladd's Discount Book is also effectively represented, and the manner of its use and its advantages indicated.

Recent Exports.

PER SHIP ELBE, SEPTEMBER 28, 1888, for MELBOURNE, AUSTRALIA.

By Woodhouse & Stortz.—12 cases Hardware, 8 Stoves, 526 pounds Shade Rollers.

By Ilsley, Doubleday & Co.—33⅓ gross Axle Grease.

By S. H Payne.—3500 pounds Plated Ware.

By Lazarus & Rosenfield.—20 cases Clocks.

By F. Kroeber Clock Company.—1 box Clocks.

By Arnold, Cheney & Co.—12 cases Iron Castings, 4 cases Forks, 7 cases Axles, 20 cases Children's Wagons, 4 cases Spokes, 2 cases Spokes, 4400 pounds Axles, 2 cases Plows.

By Healy & Earl.—6 packages Forges, 17 cases Woodworking Machinery, 2 Iron Safes, 10 packages Forges, 2 cases Saw Mills, 1 box Belt Hooks, 1 case Woodworking Machinery, 3 cases Sandpaper.

By Rand Drill Company—1120 pounds Drills, 5910 pounds Air Compressor and Parts.

By H. W. Peabody & Co.—44,800 pounds Barb Wire.

By Arkell & Douglas.—3 dozen Razors, 10 dozen Axes, 6 dozen Shovels, 6 crates Traps, 3 dozen Toys, 1 dozen Wringers, 7 dozen Roller Skates, 5 dozen Wall Brackets, 5⅜ gross Fruit Jars, 9 dozen Hammers, 1 gross Glue, 4 dozen Planes, 20½ dozen Saws, 3 dozen pairs Roller Skates, 601 pounds Brackets, 975 pounds Hardware.

By R. W. Forbes & Son.—10 dozen Axes, 14 packages Hardware, 31 packages Hardware, 3 dozen Fork Handles, 25½ dozen Axes, 26 packages Hardware, ¼ dozen Hardware, 908 pounds Carriage Bolts, 30 packages Hardware, 24 dozen Hatchets, 36 dozen Sledge Handles, 6 packages Plated-ware, 3180 pounds Carriage Bolts, 5 dozen Wringers, 6 dozen Egg Beaters, 23 packages Stoves, 1 case Hardware, 33 Bolt Clippers, 24 dozen Axes, 1 dozen Hay Knives, 6 dozen Wringers, 16 packages Stoves, 1200 Carriage Bolts, 3 sets Wheels, 8 boxes Hardware, 142 pounds Rivets, 1 case Bicycles, 280 pounds Nails.

By Coombs, Crosby & Eddy.—42 dozen Edge Tools, 1500 Bolts, 20 dozen Handles, 21 dozen Edge Tools, 10 dozen Hardware, 2 gross Glue, 5 gross Tools, 25 dozen Hardware, 10 cases Clothes Pins, 500 Broom Handles, 3 dozen Handles, 3 Pumps, 168 pounds Nails, 3 Meat Presses, 4 Lamps, 3 dozen Traps, 29 dozen House-Furnishing Goods.

By W. H. Crossman & Bro.—12 dozen Curry Combs, ⅛ dozen Sausage Stuffers, 1⅛ dozen Wagon Jacks, 13 dozen Scroll Saws, 20 dozen Washboards, 22 dozen Wrenches, 3 dozen Tills, 1-6 dozen Store Trucks, 41 dozen Meat Cutters, 5 1-6 dozen Bird Cages, 1 dozen Wood Scoops, 3 dozen Churns, 12 dozen Mouse Traps, 12 dozen Vises, 3 dozen Scroll Saws, 6 dozen Bench Screws, 1 dozen Oil Stoves, 5 gross Blacking, 1 dozen Sinks, 24½ dozen Pulley Blocks, 4½ gross Axle Grease, 3300 pounds Axle Grease, 2900 pounds Nails, 5000 Paper Shells, 11 cases Cartridges, 202 pairs Roller Skates, 1 Crate Washers, 11,200 pounds Barb Wire, 18 dozen Razor Strops, 43 dozen Axes, 30 dozen Hatchets, 12 cases Carpenters' Tools, 7 cases Hardware, 32 packages Hardware, 54 dozen Handles, 1750 feet Chain, 7 packages Pumps, 3 dozen Wrenches, 1006 pounds Packing, 66 packages Carriage Hardware, 30 dozen Axes, ½ dozen Folding Beds, 1 case Hardware, 14 dozen Picks, 3 dozen Axes, ½ dozen

Washers, 20 dozen Axes, 1½ dozen Wringers, 40 boxes Clothes Pins, 52 Axes, 12 dozen Hatchets, 20 dozen Shovels, ½ dozen Mangles, 1 case Tools, 1803 pounds Hardware, 1 crate Washers, 4 packages Tools, 43 dozen Wrenches.

By H. W. Peabody & Co.—10 packages Agricultural Implements, 14 packages Typewriters, 15,000 pounds Handles, 72,000 feet fuse, 62 packages Grease.

By H. Behr & Co.—4 cases Sandpaper.

By Strong & Trowbridge.—9 cases Cartridges and Shells.

By Welsh & Lea.—26 cases Hardware, 4 cases Saws.

By Meriden Brittania Company.—18 packages Plated-Ware.

By Morris, Strouse & Co.—21 dozen Handsaws, 10 dozen Plumbs and Levels, 6 gross Forks, 1 gross Mop Sticks, 45 dozen Mouse Traps, 3 gross Tools, 48 dozen Gate Hinges, 2 gross Liquid Glue, 24 dozen Hammers, 18 gross Hat and Coat Hooks, 3 gross Sad Irons.

By Seth Thomas Clock Company.—65 boxes Clocks.

By A. S. Lascelles & Co.—100 cases Slates, 10 cases Handles.

By S. Halsey & Son.—110 pounds Hardware.

By Thompson, Bedford & Co.—1 case Plated-Ware.

By Strong & Trowbridge.—3 cases Carriage Hardware, 5 cases Broom Handles, 30 dozen Axes.

By Ansonia Clock Company.—66 boxes Clocks.

By W. K. Freeman.—242 pounds Horse Nails, 6 boxes Hardware.

By R. Irwin & Co.—2 cases Hardware.

By A. Field & Co.—24 dozen Carriage Ironwork, 9000 pounds Tire Bolts, 3 cases Carriage Ironwork, 45 Axles, 6 sets Axles, 16 sets Wheels, 450 dozen Whip Handles, 40 dozen Harness Trimmings.

By Crane & McMahon.—20 cases Carriage Ware, 101 packages Carriage Ware, 25 cases Carriage Ware.

By E. Miller & Co.—19 boxes Lamp Goods, 4 packages Lamp Goods.

By Welsh & Lea.—5 cases Iron Bolts, 50 boxes Clothes Pins, 9 packages Hardware, 5 cases Shovels.

By Russell & Erwin Mfg. Company.—5 cases Hardware.

By McLean Bros. & Rigg.—1900 pounds Nails, 160,000 Rivets, 20 dozen Axes, 26 dozen Brackets, 19 dozen Clocks, 4 dozen Lampware, 9 boxes Castings, 5 cases Tacks, 2 crates Tills, 56 pounds Oil Stones, 24 dozen Fly Traps, 18 dozen Scales, 24 dozen Saw Sets, 29 Vises, 24 dozen Hammers, 2 dozen Grindstones, 12 dozen Braces, 10 Bench Screws, &c., 31 Stoves, 13½ dozen Shoe Brushes, 895 Staves, 100 dozen Sporting Goods, 3 dozen Pick Handles, 3 dozen Mop Heads, 84 dozen Axe Handles.

By W. R. Cameron & Co.—5 cases Sand Paper, 1 case Machinery, 21 cases Iron Bolts, 14 cases Meat Choppers, 125 cases Axes, 2 cases Bolts, 21 cases Castings, 5 cases Springs, 14 cases Bolts, 83 cases Handles, 1 box Castings, 2 cases Sand Paper, 1 case Hardware, 2 cases Hat Racks, 1 case Grease, 5 cases Hardware, 2 cases Wagons, 48 cases Trucks, 1 case Brushes, 6 bundles Handles, 5 cases Wheels, 1 box Children's Wagons, 3 cases Hardware, 9 cases Wagons, 39 cases Shoe Nails, 1 case Tools, 5 cases Blacking, 20 barrels Blacking, 1 case Shoe Knives, 104 cases Handles, 110,000 pieces Slate, 21 dozen Shovels, 35 cases Edge Tools, 7 cases Shovels.

American Hardware in the Australasian Colonies.

The following is a continuation of the article in the Australasian *Ironmonger*, from which we gave an extract in our last issue. It is of interest as relating to the position held by American Hardware in the Australasian Colonies:

NEW ZEALAND.

General Hardware.—The Lock trade, in which America had the run of this market for cheap Locks, has, to a large extent, failed them recently, owing to English makers bringing out Locks in wrought metal as cheap as the American in cast. This result has, however, been attained by English makers, to a large extent, copying American patterns and style. The packing of the American Lock, however, still remains superior. In light castings Kenricks have taken a large portion of the trade the Americans once had. In light edge tools the Yankee is not holding his own; the English makers have improved the finish of their tools and are quoting lower prices. In carpenters' Braces, special wood-working tools, and carpenters' Hammers, however, the American makers are quite holding their own. In Axes, also, the American is pre-eminent; nothing can touch the productions of the Douglas Axe Company, or those of the Francis Axe Company. Oliver Ames Corporation also sweeps the board nearly so far as Shovels are concerned, although Sheffield is and probably will increasingly push into a share of this trade. In Lamps America is again coming to the front, especially in force draft and circular wick with central draft. In Electro-Plated Ware American travelers are offering patterns which come nearer to English ideas of chaste beauty, and there still continues to be a fair demand for the showy striking designs they have for some time been noted for. In Hay Forks the English makers are picking up more of the American ideas, and are putting them in at cheap rates. In all kinds of Handles, however, the American timber has all its own way. Barb Wire is nearly out of the market; a little of Johnstone, however, is coming forward, but the freight kills it. In Cotton Duck, until recently, all has come from America, but recently Heavy Cotton Duck and Canvas have been obtained from England at prices slightly over the American, but the quality is improving every shipment. In Kerosene, Turps., Rosin, none but American is on this market. Although outside the trade it might be mentioned that large quantites of Sausage Casings and Clover Seeds are imported from America.

In the ironmonger's trade it is estimated that American goods represent from 15 to 20 per cent. of the whole. The following are, at all events, the principal items in this line: Axes, Picks, Shovels (no Spades), Hay Rakes, Hay Forks, Scythe-Handles (but few, if any Scythes), Garden Rakes and Hoes, Wash-Boards, Tubs, Hammers and Chisels (a few, but the bulk come from England), Locks, Scales and Weighing Machines, Stoves. Of Saws, the Hand-Saws are mostly from America, and Circular Saws chiefly from England. Then there are Churns, Carriage Woodware, Barb Wire, Smallware (such as Apple Parers, Egg-Beaters, &c.), Lawn Mowers. In Agricultural Machinery, Hornsby's Reapers and Binders take the lead, and the Buckeye Mowing Machines and Reapers and Binders are also favor.tes.

We have on a former occasion remarked upon American garden tools, such as Rakes, Hoes and Lawn Mowers, as being much lighter and better balanced than the old English types, and the same thing may be said of other similar goods. The representatives of English manufacturers are beginning to visit these colonies more frequently than they used to do, and they can easily ascertain and judge for themselves the extent of trade which they are likely to lose. Every year these markets will be extending in importance and British manufacturers can easily, if they think it worth while, retain the trade, as some importing houses find it easier, through their more settled connections and channels, to obtain goods from England that from America. An effective effort in this direction has already been made by certain Lock-makers, with satisfactory results.

Boring Implements, which include a large variety of tools, are well supplied by several firms. In this respect perhaps the Millers Falls Company deserve first place for "Barber" Bit Braces, Ratchet Braces, Breast Drills, &c.; then comes W. A. Ives, for excellence in Hollow Augers, Expansion Center Bits, &c. Cook's Auger Bits are being favorably known, but have had to give place latterly to Gilpin's English make. For jobbers' and machinists' Drills the Morse Twist-Drill Machine Company stand high.

Chisels, Gouges, &c.—For a long time the American Socket and Socket-Firmer Chisels and Gouges held a high place in the esteem of the colonial workmen, but for some reason the sale, to a great extent, has fallen off, and the English makers still hold sway in this line.

Forks.—When Sluice Forks were largely required the names of Sheble & Fisher and Tuttle were to the miner guarantees of a good article, but hydraulic sluicing has driven this tool from the market. American Hay, Manure and Spading Forks hold their own against English manufacturers, though the Hay Forks are in danger of being squeezed out by the great English makers.

Hammers.—In all kinds of bench and artisans' Hammers the Henry Cheney Hammer Company were the first to present us with a perfect article, and they have deservedly obtained a large trade. They still hold the position, but the English makers, Spear & Jackson, are treading fast on their heels.

Hones.—All the finer kinds of stone used for sharpening good tools are supplied from America, among which are Arkansas, Washita, Indian Ponds, &c.

Planes.—We have to thank the Stanley Rule and Level Company for the introduction of these combinations known as Iron Block Planes, the Bailey Adjustable Plow, &c.

Picks.—Some 15 or 20 years ago it was almost impossible to sell any other than a Collins' Pick. At the present time it is difficult to get cost price for them. They have been superseded by several English makers, notably Edwards, Holt, Richards. The principal reason for this is to be found in the pattern; English makers put more strength in theirs.

Plumbs and Levels of all styles and sizes for the use of carpenters, bricklayers, engineers, surveyors and others, this company's goods are ahead.

Saws.—Among American makers in this line Henry Disston & Sons, Keystone Works, Philadelphia, stand pre-eminent. From the list of Hand Saws we select Nos. 7, 76 and D8 as being the most popular: from Cross-cuts, the Great American and Drag-Tooth. In Mill Saws the English makers, Wheatman & Smith and Spear & Jackson, dispute the ground, especially the latter, whose make is said to be very reliable.

Shovels.—Of long standing in the public estimation, especially in that of contractors, mining companies, &c., is the Shovel known as O. Ames. No tool has had so firm a hold of the market, and retained it for such a period, as Ames' No. 3 L.H.R.P Shovel, and in saying this we may be quite sure it is because it has been the best. Both the miner and contractor have long ago indorsed that verdict. When it comes to a D or Crutch-Handle Shovel (the latter is seldom used), the Americans are out of it. In coal mines and on railways the English maker gets a chance.

Spades.—The American article has never taken anything like first place in this market, being too light and flimsy for a new country, where stumps and roots are so frequently encountered; the English make are much stronger.

Locks.—So many new departures from the old stereotyped form and patterns of the Old World have been taken by the Americans that it is difficult to say which is the most startling; but certainly the Lock trade in that country has grown into an industry marked by astonishing novelty and ingenuity, and in the building up of this trade light castings have been a surprising factor, enabling the maker to place a neat, handy and cleverly constructed Lock on the market at prices never heard of. The best-known makers here are the Russell & Erwin Mfg. Co. and Sargent & Co. for House Locks, and the Yale Mfg. Company for the finer kinds.

Nails.—Time was when we obtained from America the bulk of the Cut Nails we built our wooden houses with, but that is a long time ago. The Wire Nails from the Continent of Europe have squeezed them out; we still import from there some lighter kinds, such as Finishing Brads, Hungarian Boot Nails, &c., while American Horse Nails have entirely obliterated the English and Scotch makes, and the Putnam Horse Nail is a "household word" in every smith's shop in the colony.

Castings.—The thousands of uses that Light Iron Castings have been put to by the American manufacturers are a monument of their ability, ingenuity and skill. In this department America stands unrivalled. It would be quite useless to attempt to enumerate the goods made in this way, and for the same reason we can only mention a few manufacturers in this line. The most important industry under this heading, perhaps, is cooking and heating Stoves; the elegance of design arrived at by some makers is astonishing, when we take into account that utility must not only be preserved, but made more and more perfect. The highest class Stoves are seldom seen in this colony, because in our towns we mostly use English cooking Ranges, which are built in as fixtures.

Machinery.—In harvesting and field requirements the Reaper and Binder has played by far the most prominent part with us among American productions, the other leading lines calling for mention being few. Horse Rakes are perhaps the next in importance, and of these the Taylor and the Buckeye are best known. In Plows, the American-made that have come to hand are limited in number and not suitable. The English makers provided these for many years, but for a long time past colonial-made Plows have, in a great measure, put the imported ones out of the market. Lightning Hay Knives and American Scythe Snaths should here be noticed, especially the latter, as having completely superseded those crude, unhandy articles that English makers dispatched to the colonies in the early days of colonial history. In this connection, for small holdings and garden cultivation, the Planet Junior farm and garden implements are superseding the ordinary hand implements; their combined Drill Cultivator and Plow is a really useful line, as is also their No. 2 Seed Drill, and we may fairly look for a rapid extension of their use. This brings us to a notice of Lawn Mowers, the makers of which have been many and various. Among those the Philadelphia, the Excelsior and New Easy are the best in this market. Corn Shellers, among farm requi-

sites, should not be forgotten, although they have been patronized more, perhaps, by our Maori population than by the whites. Ames Plow Company are the most favored makers in this line, as also in Hand Corn Mills and Thermometer and other Butter Churns. There are very few dairies in this country where these goods are not well known and highly appreciated.

VICTORIA.

As the result of inquiries as to what extent American manufactures are being successfully introduced into this colony, I find that in some lines American manufacturers and merchants are pushing their trade in articles in which England formerly was supposed to excel beyond fear of competition. This applies more especially to Stoves, Locks, Lock Furniture, Bolts, Cutlery and Steelware; Axes are almost an American monopoly, as also Buggy and Wagon Woodware and Iron Fittings. Braces and Bits, Hammers, Joiners' Tools, and a large variety of Shelf Goods are also well stocked here.

The English wares are not being ousted because the American manufactures are in all cases better, but because the latter are, as a rule, pushed with more energy, system, and local adaptability. English manufacturers in the past have not been in the habit of studying the changes in the requirements of the market as their competitors have done, though lately there are signs that many makers are awakening both to their own interest and to the fact that the colonies require well-finished, low-priced, and suitable articles.

In Electro-Plated Ware and Britannia Metal Goods the Meriden Britannia Company, Reed & Barton, and Simpson, Hall, Miller & Co. are the principal firms doing business here. A good trade has lately been done by these firms in low-priced Cruets, Tea Sets, Spoons and Forks, Cake Baskets, Ice Pitchers, Card Receivers, Pickle Castors, &c., all of which are in good demand and meet with a ready sale.

In Tools an immense number of American firms are competing for a share of our imports. Among Edge Tools the American Axe is

Fig. 280.—Elevator Guides.

almost a monopoly in this market; the principal makers are the Douglas Axe Mfg. Company. General shelf goods, such as Locks, Butt Hinges, Flush Bolts and Rings, Barrel Bolts, Letter-Box Plates, Door Bell Handles, Sash Fasteners, Sheaves, Pulleys, Brackets, Lock Furniture and general Hardware, are largely imported, and in some lines, especially in Locks, are quite superseding English makers, as far as extensive sales are concerned. The American Lock commands the market through being lower-priced and more attractive, although where price is a secondary object for really first-class buildings the English make is generally adopted.

Cutlery.—The efforts made by American manufacturers of Cutlery to open a market here have been few and far between, and sufficient energy has not been shown in pushing a trade. Finding the competition very great in this class of goods, and not by any means an easy job to have it all their own way, they have neglected this for other markets, where a larger business can be done and better profits realized. An exception to the above is to be found in Butchers' Knives, which are highly appreciated and have a good sale. Razor Strops of all kinds are imported.

Stoves, Ranges, &c., have been well pushed here, Stoves especially being well stocked, but Ranges, perhaps because they are more distinctly English, are more scarce. The competition in this line has been very keen, with the result that some surprisingly economical Stoves have been devised to run the market.

Lamps of late years have undergone great improvements, and some beautiful designs have been introduced both in low priced and more expensive, but they are not nearly as plentiful here as one would expect.

Buggy and Wagon Woodware and Fittings.—Although the demand for this class of goods has fallen off considerably the last year or two, principally on account of the extension of the tramway system here, and consequently the fewer coaches, &c, required, there still has been a fair amount of business transacted in these lines. American firms are not competing in Axles for Buggies, &c., with the English, who command the Australian trade, but are, nevertheless, largely sending here Nut and half Patent axles. American Varnishes only command a portion of the trade here; the gallon measure, being less than the English, is found to be very objectionable to the retailer.

Among what may be called miscellaneous imports I may mention Ice Chests, Wood Step-Ladders, Mouse Traps, &c., Bolt and Rivet

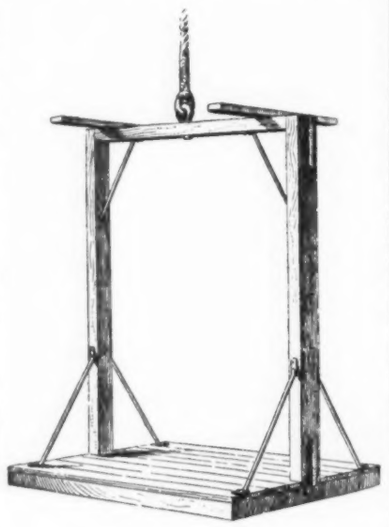


Fig. 281.—Elevator.

Clippers, Tacks, Sewing Machines, Scales and Weighbridges, Wire Goods, Sausage Machines, Washing Machines, Wringers, &c., Davis Swing Churn, Axe Handles, Axle Grease, Lubricating Oils, Paints, Kalsomine, &c., and Smiths' Forges. A special line which adorns the windows of most ironmongers are iron toys, consisting of Mechanical Money Banks made in attractive designs, Paper-Cap Pistols, &c.

Cartridges are freely imported, and the demand seems to be increasing of late.

Barb Wire is a line in which business is always doing; there is hardly a ship leaves either Boston or New York for Australian ports without a greater or less number of reels.

Among *Agricultural Implements* and machinery of American manufacture the most prominent are, of course, the Reapers and Binders, in which an immense trade has been done here during the last few years. They form a leading feature at most of the agricultural societies' shows, and during harvesting operations it will be difficult to find a district in the colony where they are not to the fore. Portable Engines of American make are, I believe, unknown here, the numerous English manufacturers of the articles having it all their own way; but, among smaller field implements, there are many that are highly appreciated for their light and handy qualities. Among these are Horse Hoes, Spring-Tooth Harrows, Acme Pulverizing Harrow, Clod Crusher and Leveler, with Reversible Coulters, Winnowers, Seed Sowers and Threshing Machines. American Plows do not seem to take in Victoria, but the Plows of B. F. Avery & Sons are well known in Sydney. Other goods favorably known are Hay Forks and Windmills.

Agricultural Hand Implements, such as Shovels, Spades, Scoops, Rakes, Tine Hay Forks, &c., are well known here.

General Machinery and *Engineers' Tools* are frequently met with, yet they form a very inconsiderable item when compared with the imports from Great Britain. American Pumps and Hydraulic Machinery are better stocked.

Arrangement of Stores.

We have received from A. M. Smith, Pike, N. Y., the following description of his Elevator, which is illustrated in the accompanying cuts Figs. 280, 281, 282, 283 and 284. After alluding to his store as 26 x 62 feet and 12 feet between floors, which he refers to as sufficiently high for a village, Mr. Smith says:

When I was putting in my counters and shelving I began to think how I was going to get Sash, Doors, Blinds, Nails, Stoves, Grass Seed, Clover Seed, &c., up-stairs, since the main floor would be entirely inadequate. I then started for Buffalo to see what an Elevator could be obtained for. One house offered me the boat and gearing for a light one for $175, and I was to furnish material and put it up, besides paying freight to Pike. This appeared rather expensive to one not acquainted with such a labor-saving machine. I then visited several stores and observed the manner in which Elevators were made and managed, and having got a few points settled I came home without having purchased. I then drew up my plan and set my carpenters to work in good earnest. I first took some gearing out of a Mowing Machine in the old Iron; made a drum 3 feet long and a bull wheel 5 feet in diameter; made two stationary guides out of 2-inch hard wood, bolting them well

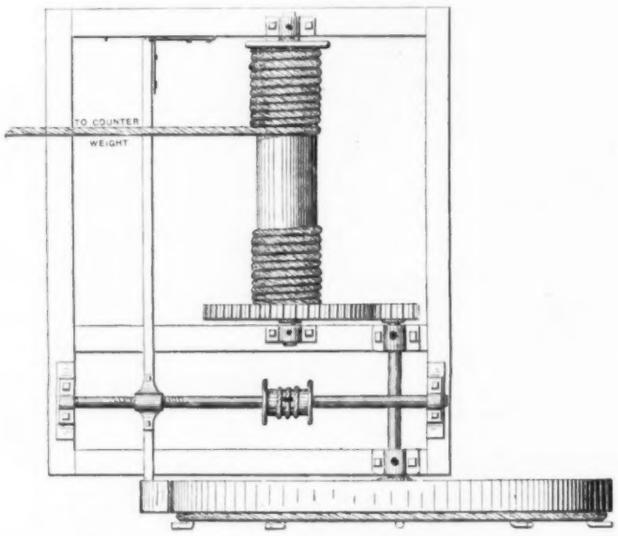


Fig. 282.—Plan of Hoisting Apparatus, Top View.

together (Fig. 280). The middle piece was only 3 inches wide, while the outer ones were 4½ inches, leaving a groove 1½ inches deep for the boat to draw up and down in. To avoid friction I cut out the tongue on the boat all but about 1 foot on the top and bottom, as shown in Fig. 281, and then set in some sash rollers to keep it just as I wanted it. This was all done by hand, and under every disadvantage possible. I paid about $4.50 for having the irons connected with it

made, making it sufficiently strong to carry a ton with safety. With reference to the brake, Figs. 283 and 284. In this I used an inch bench-screw welded to a long arm, and a drum made upon that for a rope to run over. One end of the brake was held by a strap hinge. This brake is on the bull wheel, and will stop and hold the boat with a full load with a single jerk of the rope. The rope goes over the drum on the brake three times, and a staple fastens it in the middle to prevent any slipping. This brake rope is $\frac{5}{16}$-inch Manila, and goes over a pulley on the lower floor by a guide, so as to be always in place and in order. The arms to the boat, Fig. 282, are 7 feet long, and the bottom or platform $3\frac{1}{2}$ x $4\frac{1}{2}$ feet. The cross-bar where the rope attaches to the bottom has two arms on it to catch and take up the hatchway cover of the floor above, Fig. 284. The lifting rope goes through the center of this hatchway cover, which is kept in place by guides, the same as the boat. Hence when the elevator is down the door or hole is always closed, and no one can step through.

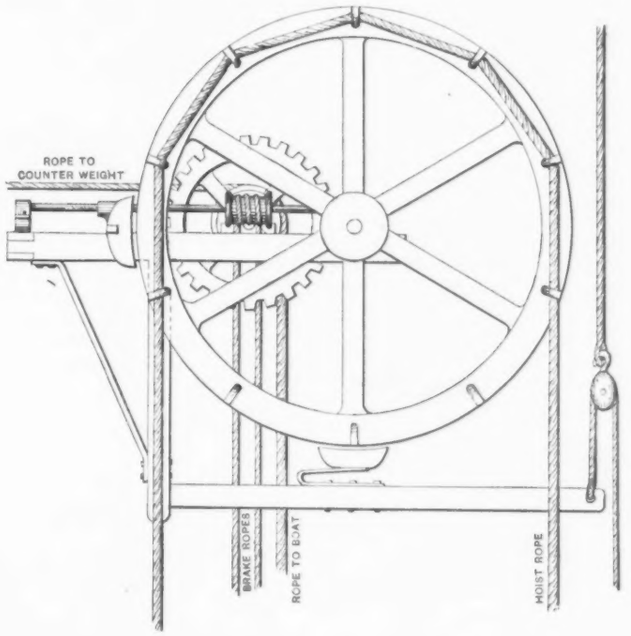


Fig. 283.—Side View of Hoisting Apparatus.

To the main drum that winds up the boat there is a rope attached which runs to the back end of the shop, and there a counterweight is attached weighing about 280 pounds. Thus weighted the boat will go up at a good motion alone, and stop when at the right point. This weight is of great importance. The boat never falls or jerks around and it holds back when going down loaded as much as it helps going up. When going down loaded I soon found that my screw brake was not the thing, as it would either stop it or let it run too fast. Then I put a leather upon a trap spring so as to draw it by means of a rope against the under side of the bull wheel, an arrangement which worked satisfactorily. I could control the elevator at will, so that with Stoves on trucks a boy 8 years old can move the heaviest Range upstairs and down, and as the elevator also goes into the cellar it can be used for taking down Oil, &c., in barrels, and other heavy goods. Now, what will make all this interesting to some reader in some town who is still using a grab or chain, taking up Stoves or bags by hitching on, is the cheapness of it all. The weight is a box 1 foot square on the bottom, 2 feet long, filled with fine scrap iron. It has guides on two sides and runs up and down like the boat, always there. The actual cost was considerably less than $40, counting in my expenses. It now carries five kegs of Nails easily, and I can change the drum so as to make it handle ten, but, of course, what is gained in power is lost in time; 500 pounds is all I ever want to handle, and if I had 700 pounds on and did not care to pull much I would call for another hand to help work the rope. I would not be without it now if it were to cost me $200 or more. If any of your readers would like further details in regard to this matter I should be pleased to send them.

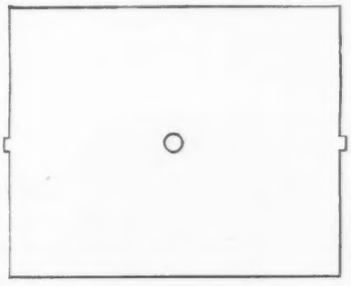


Fig. 284.—Hatchway Covering.

"Boycotting"—Criminal Conspiracy.

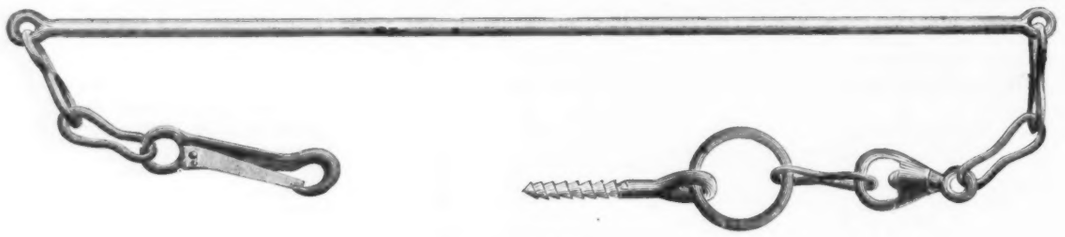
B. Brothers were stationers and printers in Richmond, Va., and they refused, on the application of the Richmond Typographical Union, No. 90, to make their printing office a "union office"; whereupon these printers and a trades union association known as "Knights of Labor," the former numbering 100 members and the latter several thousand men, declaring that they would destroy the business of B. Brothers by "boycotting" them, threatened a number of the business men and others in Richmond with the loss of their business if they dealt in any way with B. Brothers, and that their names would be published in a "black list" in the *Labor Herald*. In this same *Labor Herald* the employees of B. Brothers were denounced so that public feeling should be directed against them, even to preventing them from obtaining food and shelter. B. Brothers made complaint of this combination against them, and C. and others of the typographical union and the Knights of Labor, and they were indicted for criminal conspiracy. C. elected to be tried separately and was convicted. He carried his appeal—Crump *vs.* Commonwealth—to the Court of Appeals of Virginia, where the conviction was affirmed. Judge Fauntleroy, in the opinion, said: "The essential idea of 'boycotting,' in Ireland or the United States, is a confederation, generally secret, of many persons, whose intent is to injure another by preventing any and all persons from doing business with them, through fear of incurring the displeasure, persecution and vengeance of the conspirators. A wanton, unprovoked interference by a combination of many with the business of another for the purpose of constraining that other to discharge faithful and long-trained servants, or to employ whom he does not wish to or will employ—an interference intended to produce, and likely to produce, annoyance and loss to that business—will be restrained and punished by the criminal law, as oppressive to the individual, injurious to the property of the community, and subversion of the peace and good order of society. The defendant lays great stress upon the Massachusetts case of Commonwealth *vs.* Hunt, 4 Metcalf's Reports, p. 111, as authority to sustain the legality of boycotting, but there is an obvious distinction between that case and this. That case arose out of the action of a club or combination of journeymen bootmakers, which had been formed simply to better their own condition, and it had no aim or means of aggression upon the business or rights of others. They simply had regulations for themselves; they did not combine or operate to oppress others. But, even in that case, the court, after supposing the case of a combination for the ultimate and laudable object of reducing by mere competition the price of bread to themselves and their neighbors, said: 'The legality of such an association will therefore depend upon the means to be used for its accomplishment. If it is to be carried into effect by fair and honorable means, it is, to say the least, innocent; if by falsehood, or force, it may be stamped with the character of conspiracy.' 'Force may be operated either physically or mechanically; or it may be coercion by fear, threat, or intimation of loss, injury, obloquy, or suffering.' The acts of the defendant and his associates here are unlawful and incompatible with the prosperity, peace and civilization of the country; and if they can be perpetrated with impunity by combinations of irresponsible cabals or cliques, there will be an end of government and of society itself. The motto of the law is this: 'So use your own rights that you shall not injure others' rights.'"

The exportation of silk from Japan during the year 1887–88 was estimated at 38,958 bales, against 26,370 bales in 1886–87. The United States are at present the largest consumers of Japanese silk and figure in the last report for nearly 21,000 bales, while only 1735 bales were exported to Great Britain. The crop of 1888, estimated, is roughly at about 6,500,000 pounds, of which about 40 per cent. will be consumed in the country.

The London *Engineer* says: Now that the question of Ramsbottom's trough is under discussion in connection with the "race to Edinburgh," it may be worth pointing out that the late Mr. Ramsbottom was not the first and true inventor of the contrivance. It was patented in America in November, 1854, by McDonald. Mr. Ramsbottom's English patent was taken out in 1860, and is numbered 1527.

Horse Hitchings.

Oliver Bros. & Phillips, Pittsburgh, Pa., for whom the H. B. Newhall Company, 107 Chambers street, New York, are agents, are manufacturing a line of Stiff Horse Hitchings, which are represented in the illustration given herewith, which explains the article so fully that no detailed description is necessary. The special advantage alluded to in the use of this article is that it will prevent cribbing. It is made of iron, and is furnished both self-colored and galvanized.



Horse Hitchings.

Clipper Tool, Knife and Scissors Grinders.

The Higganum Mfg. Corporation, 189 and 191 Water street, New York, are putting on the market an interesting line of grinders, invented and patented by Mr. R. Dutton, some of which are illustrated in the cuts herewith given. Fig. 1 represents their No. 4 Clipper, which is run, it will be observed, by means of a belt, and is designed for grinding plane irons, chisels, gouges, &c. It has four wheels, numbered 1, 2, 3 and 4 in the cut. There are also, it will be seen, clamps E and F, which are used for holding the tools to be ground. The wheels 1, 2 and 3 are used for grinding gouges, and are respectively $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ inch in thickness, the rims being rounded. Small gouges less than $\frac{1}{2}$ inch in diameter will be ground upon wheels Nos. 2 and 3 while held and guided with the hands, but for larger gouges the swivel and gauge clamps, F and H, are used, the cut representing this attachment as down in the position in which it naturally remains when not in use. In using this clamp the gouge to be ground is securely fastened in it at F, the hinge at H permitting the requisite pressure on the wheel, while the rocking motion permitted by the swivel allows the grinding of the entire edge of the gouge, an operation which is, it is claimed, accomplished with great ease and success. Wheel No. 4 is flat-faced, 1¾ inches thick, 5 inches in diameter, and has a hollow in the center 3 inches in diameter. The corundum grinding-wheel used in this machine is referred to as superior to the emery-wheel. Water when placed in the trough is admitted to the inside of the wheel through a small opening in one of the flanges for holding the wheel in place, so that it has water both on its inside and outside. When operating the machine the water in the center of the wheel is described as being driven through the pores of the wheel, wetting every particle thoroughly. This is referred to as preventing the tool while being ground from heating or having its temper drawn, and also preventing the wheel from becoming glazed by use. The tool while being ground is held firmly in the clamp E, which is directly in front of the operator and controlled by his left hand by means of the handle D. By this means plane irons, chisels, &c., may be quickly ground to the bevel desired, and the manufacturers allude to the accuracy and perfection with which this is done. It is claimed that with this machine a gouge can be as quickly and easily ground as an ordinary plane iron or chisel.

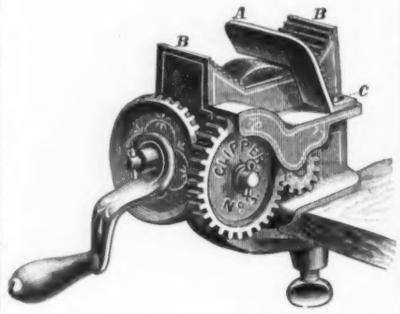


Fig. 2.—No. 3 Clipper Grinder, with Attachment for Grinding Scissors.

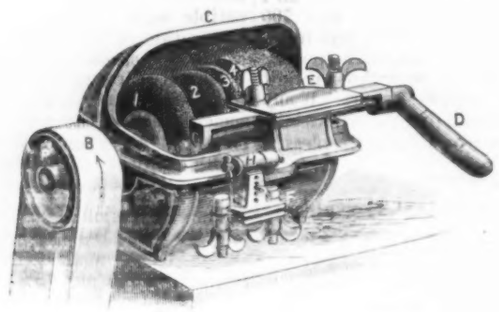


Fig. 1.—No. 4 Clipper Grinder, with Attachment for Grinding Gouges.

This grinder is intended to be run from 700 to 800 turns per minute, the arrow showing the direction. Its weight is 17½ pounds.

Fig. 2 represents the No. 3 machine, a tool designed for family use, for sharpening knives, scissors, &c. The machine is represented in the illustration as clamped to the corner of a table. The wheel, like that described above, is a corundum wheel 4 inches in diameter, with 1-inch face, geared to revolve six times to one turn of the crank, grinding as fast as a wheel 24 inches in diameter not geared. The wheel runs, it will be observed, in a trough of water. For grinding scissors the guide A attached by the screw C is removed. The facility with which carving or table knives can be ground on this machine is alluded to, and it is claimed that any person, however inexperienced, can do this perfectly. The weight of the machine is 5 pounds. Fig. 3 represents the Clipper Grinder No. 1, which has, it will be observed, some of the features of the machine shown in Fig. 1, the corundum wheel being 5 inches in diameter, 1¾-inch face, with a hole in the center 3 inches in diameter by which the water in the trough is given access to it. By one turn of the crank the wheel is revolved nine times, so that grinding will be done more rapidly than upon a large wheel when not geared. The same machine is made without a stand and provided with thumb screw to clamp it on the bench. It is pointed out that

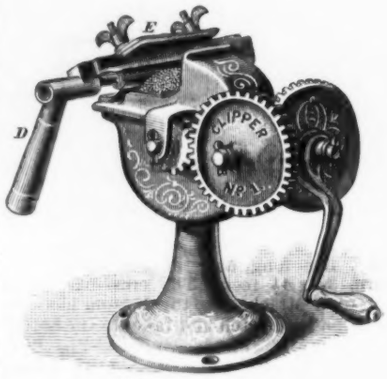


Fig. 3.—No. 1 Clipper Grinder.

with this machine plane irons, chisels, &c., may be ground to any bevel desired. The company also make another machine, Fig. 4, which they designate as No. 5, which is intended for the same purpose as their No. 1, shown in Fig. 3, but it has a pulley and belt in place of a crank and gear to run it by. The speed of this machine

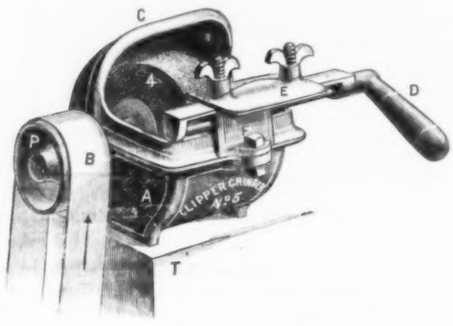


Fig. 4.—No. 5 Clipper Grinder.

should be from 700 to 800 revolutions per minute. They also make a No. 2 Grinder in which a free grit stone is used. It is a small and compact machine for sharpening tools, knives, &c.

The American Frame Pulley.

We illustrate herewith the American Frame Pulley, a new form now being put on the market by Palmer Hardware Mfg. Company, Troy, N. Y. Like their other

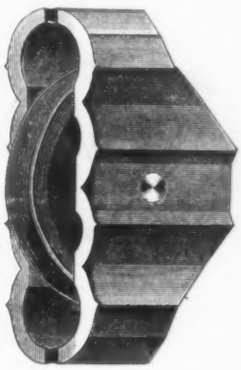


Fig. 1.—The American Frame Pulley.

styles of pulleys, it has its face edges curved to adapt it to fit a mortise made of a series of connected auger holes, and has markers on its edges with which to indent in the wood the exact centers on which to start the bit. The case is made up of a series of angular swellings, the apexes of which extend slightly beyond the curved lines of the face edges—the rear edge of the case being a hollow chisel. The manufacturers claim for this construction entire avoidance of the danger of splitting the jambs, as is likely to occur with those made to fill at all points a like mortise, on account of variation in position or inclination of the holes, which is unavoidable in those bored by hand. This improved form, it is claimed, will, by means of the

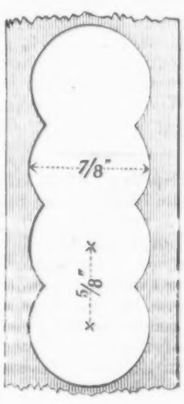


Fig. 2.—Mortise for American Frame Pulley.

rear chisel edges, cut away all obstructions caused by imperfect boring, and the apexes of the angles will hold it firmly in place. Its finish is referred to as being of the best. Only one size, 2 inches, is made. The pulleys have steel axles, and a ¾-inch bit is used for mortising.

L. & I. J. White.

The following article from the Buffalo *Express*, giving as it does a history of this long-established and well-known house, will be read with interest:

Buffalo possesses numerous points of advantage for the manufacture of specialties, and among the local industrial establishments are many whose field of operations covers the whole nation. One of the firms who e mail bears the postmarks of almost every town in the United States, as well as the strange stamps of foreign countries, is the long-established edge-tool works of L. & I. J. White, at Nos. 310, 312 and 314 Exchange street. Mr. Leonard White, the surviving partner of this widely known firm, is the oldest practical edge-tool man in America. He was born in Tolland, Conn., November 16, 1810. His family migrated to this State in 1819, settling in the town of Elba, Orleans County. When Mr. White was 16 years of age he went to Rochester to learn the trade of an edge-tool maker. For 10 years he remained in the employ of D. R. Barton, at that time the only prominent edge-tool manufacturer in this country, and during a decade of hard work he mastered the business in all its details.

In 1836 Mr. Leonard White, in company with his brother, Mr. I. J. White, established an edge-tool factory at Monroe, Mich., where for some years they carried on a flourishing business. Becoming impressed, however, with the idea that Buffalo was a more advantageous point of distribution than the Michigan town, they decided finally to change their base of operations. Accordingly, in 1844, Mr. I. J. White came here and established a new plant, on the corner of Ohio and Indiana streets. Two years later he was rejoined by his brother, who had remained in Michigan to close up the business.

About 20 years ago the works of the firm were destroyed by fire, and being desirous of rebuilding on a larger scale, the Exchange street property was secured and the present extensive works were erected. The main building, a three-story brick, is 60 x 104 feet, with an addition, 55 x 104, extending through to Carroll street. The large structure contains on the first floor the office and the grinding and polishing departments, where the duly shaped and tempered tools receive their polish and cutting edges. On the second floor is the storeroom, where the finished tools lie in drawers and cases, all classified and ready to start on their journey to Nova Scotia or San Francisco, at an hour's notice. Here too are the machine shop, pattern shop and handling department. The third floor is used as a storeroom for handle stock, packing boxes, &c.

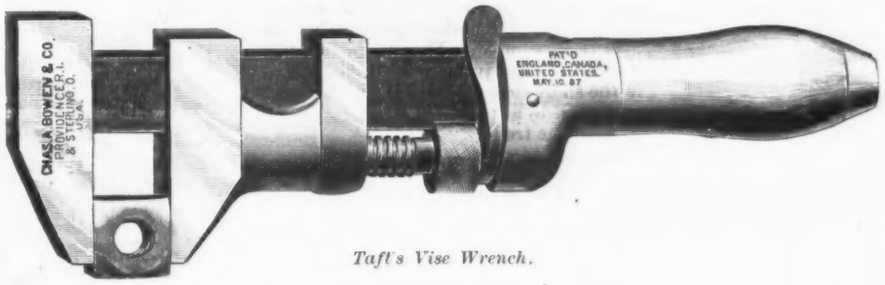
The entire extension is used as a forgeshop, and here, by means of Trip Hammers, Drop Hammers, and powerful rolls, driven by a 120 horse-power engine, the metal red from the furnace fires is welded, hammered, and rolled into the shapes which give the first hint of the finished tool. Practical edge-tool men declare this to be the best-equipped tool-forge shop in this country.

The implements made by L. & I. J. White may be divided into four general classes. First and most important among these is their line of Cooper's Tools, of which, with perhaps a single exception, they are the most extensive makers in America. These include every imaginable implement pertaining to the cooper's trade. The firm likewise turn out a great many carpenters' tools, particularly Chisels, Draw-Shaves, Plane Irons and Ship-Carpenters' Tools. A third specialty of the house is a complete assortment of Butchers' Tools, embracing all the implements used in packing houses and meat markets. And last, but not least at the present time, the vast increase in the number of planing mills and kindred industries requiring Knives, the same including Stave, Hoop and Veneer Knives, Paper-Cutting and Leather Splitting, &c., has enlarged the demand to such proportions that the Machine Knife department is now one of the most important of the business.

In 1879 Mr. I. J. White died, but the well-known firm name is still retained by his brother.

Taft's Vise Wrench.

This article is manufactured by Chas. A. Bowen & Co., Sterling Ohio, and is illustrated herewith. The special feature of the wrench is the tightening device, the arrangement of which is shown in the cut. From this it will be seen that the wrench is provided with a lever, which serves as a tightening device. This lever works on a screw in the ferrule. In use the wrench is screwed on to the work in the ordinary manner, the lever being raised in a perpendicular position, when, by pressing the lever down to the position shown in the cut, the wrench is given a vise-like grip so that it cannot slip from the work. The wrench itself is described as made of the best material, care being taken to make it a first quality article, and the manufacturers allude to the advantages it possesses in view of its tightening device, mentioning among other points that it never slips; that it is a combination of wrench, handvise and clamp in a single tool; that with it nuts can be taken off the corners of which have been grooved or rounded; that with it hot nuts may be removed without handling them, while they also indicate several other purposes for which it can advantageously be used. Its utility in the machine shop and for general use is also referred to.



Taft's Vise Wrench.

Improved Dial.

Miller Lock Company, Philadelphia, Pa., have made some recent improvements in their Champion Keyless Locks, one of

Dial (New) for No. 302, Full Size.

which relates to the combinations being made more simple without any sacrifice of security, so as to obviate the difficulty of understanding and fitting these locks in place correctly. Another improvement is in the enlargement of the dial, which is made as legible as possible, as shown in the accompanying illustration. This change is made to overcome as far as possible the difficulties in using keyless locks where there is an imperfect light, and is regarded as a decided improvement. As

some, however, may prefer the former style of dial the company are making both the old and the new. The demand for these locks for private use and for clubs, gymnasiums, associations, &c., is referred to as being such as to require an increase in the manufacturing facilities.

Sure-Grip Steel Tackle Block.

The Fulton Iron and Engine Works, Detroit, Mich., are putting on the market the Detroit Patent Sure-Grip Steel Tackle Block, which has been invented by Alexander M. Kerr, the superintendent, and patented September 4, 1888. The special feature of its construction is the brake, which, it will be observed, is exceedingly simple, consisting only of a wedge, which is

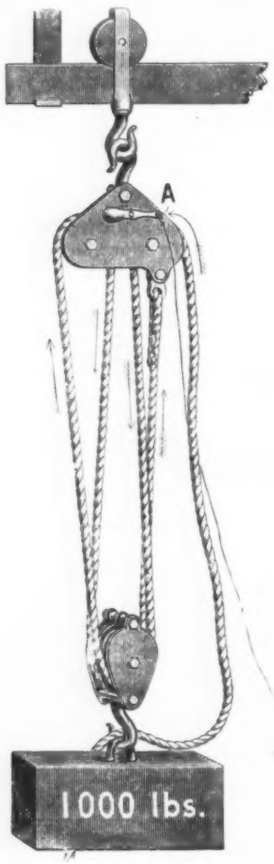


Fig. 1.—Detroit Sure-Grip Steel Tackle Block.

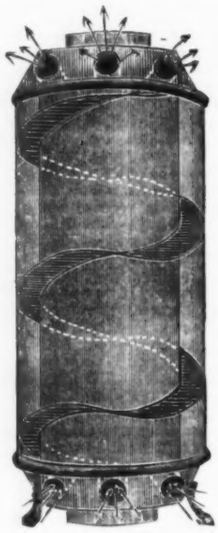
double acting, and so efficient in its operation, that it is described as absolutely automatic and certain in holding a load suspended at any desired hight without fastening the rope. The body is made of steel plates, the pins being cold rolled steel. The castings are malleable iron, thus making an especially strong and safe construction. The brake is a fluted wedge, dropped between two ropes in such a manner that the load is brought on all strands of rope at the same time. It is also pointed out that the heavier the load the more efficient the brake, owing to the fact that the fluted wedge is drawn down and points between the sheaves in proportion to the weight of load. It is also pointed out that the construction is such that the brake does not flatten the rope, wear on it being thus reduced to a minimum, and it is claimed that a partially worn rope can be used in this machine to as good advantage as a new one. The economy of labor connected with its use is also alluded to, as by its use one man can take the place of two as the brake holds the load at the end of each effort made by the operator, thus enabling him to secure a fresh grip on the load with both hands, or the load can be left hanging at any point without further attention. This block is intended for use by bridge and ship builders, contractors, hardware and other merchants, truckmen, machine shops, &c., and in

Fig. 2.—Showing Arrangement of Brake.

stringing heavy electric wires, handling barrels, baled hay, &c. The invention is the result of a necessity long felt in the company's shops for a block which would raise and lower quickly and where the hight of hoist is not limited, and with no possibility of the brake slipping when the load is suspended. The satisfaction with which the contrivance has been received in the short time it has been on the market is alluded to as indicating that it meets a want of the trade.

The Reddy Ventilator.

James M. Reddy, 317 South State street, Chicago, has designed an apparatus for securing increased efficiency from stoves, which he designates the Reddy Venti-



The Reddy Ventilator.—Fig. 1.—Sectional Elevation.

lator and Coal and Wood Economizer. It is illustrated in the accompanying cut, and consists of a sheet-iron cylinder with heads of cast iron. It is fitted with pipe collars at the top and botttom and can be used in various ways. It can be placed on top of an ordinary cylinder stove, with the smoke-pipe attached to the top and passing thence to the chimney; or it can take the place of a section of pipe on a base-burner; or it can be used as a drum in an upper room, having a connection through the floor with a range, cooking stove or heating stove in the room below. Its construction is simple. There are two sheet-iron drums, having a spiral division running up between them, with openings at the top and bottom. Air from the room passes into the center drum, and the smoke and heat from the stove circulate around the spiral passage between the

Fig. 2.—Looking Down on Top of the Head of Ventilator, Showing Damper.

two drums, heating the air, which is discharged into the room again from the upper openings, while the smoke is conveyed through the regular stove-pipe up the chimney. Two cuts herewith given show the construction of the head of the heater. This has a ventilating damper, which is left open for ten minutes or so at frequent intervals to take the foul air from the room up the chimney. When this ventilator is open no heat is thrown out into the room from the heater, but when it is closed the heater again discharges hot air into the

Fig. 3.—View Looking Inside the Head of the Heater, Showing its Construction.

room. It can be readily perceived that this device forms quite a reinforcement to the power of a stove of ordinary construction and thus secures additional heat from the fuel burned, making it possible to secure much more heat from the same fuel than when the stove alone is used. The size of the heater is 33 inches high and 12½ inches in diameter. It is mounted with either Wood's Russia planished iron or smooth sheet iron.

The Car Spring Association.—The directors of the Railway Car Spring Association held a meeting at the Hotel Anderson, Pittsburgh, on Saturday, the 13th inst. A. French, chairman of the A. French Spring Company, Limited, of that city, presided. The meeting was preliminary to the general meeting to be held on Wednesday of the present week. Only two firms in the United States are not in the association, one being the Atkinson Car Spring Company, of Chicago. This firm have brought suit against the organization and also against Park, Brother & Co., Limited, of Pittsburgh, who refused to sell them steel except at an advance of $10 per ton over what members of the association paid. The directors talked over the disposition of these two suits, and, it is reported, will contest them to the end.

CURRENT HARDWARE PRICES.

OCTOBER 17, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.

Caps, Percussion, ₩ 1000—
Hicks & Goldmark's
F. L. Waterproof, 1-10's ....50¢
E. B. Trimmed Edge, 1-10's....65¢
E. B. Ground Edge, Central Fire, 1-10's.70¢ } dis 25@25&7½%
Double Waterproof, 1-10's....$1.40
Musket Waterproof, 1-10's....50¢
G. D....28¢
S. B....30¢

Union Metallic Cartridge Co.
F. C. Trimmed....50¢
F. L. Ground....65¢ } dis 25@25&
Con. Fire Ground....70¢ } 7½%
Double Waterproof....$1.40
Double Waterproof, in 1-10's....$1.40
S. B. Genuine Imported....45¢
Riley's E. B....54¢ @ 55¢
Riley's D Waterproof, Central Fire....$1.60

Cartridges—
Rim Fire Cartridges....dis 50&5&2%
Rim Fire Military....dis 15&2%
Central Fire, Pistol and Rifle....dis 25&5&2%
Central Fire, Military & Sporting....dis 15&5&2%
Blank Cartridges, except 22 and 32 cal., an additional 10% over above discounts.
Blank Cartridges .22 cal....$1.75, dis 2%
Blank Cartridges, 32 cal....$3.50, dis 2%
Primed Shells and Bullets....dis 15&5&2%
B. B. Caps, Round Ball....$1.75, dis 2%
B. B. Caps, Conical Ball, Swaged....$2.00, dis 2%

Primers—
Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells)....$1.00, dis 2%
All other Primers, all sizes....$1.20 dis 2%

Shells—
First quality, 4, 8, 10 and 12 gauge, dis 25&10&2%
First quality, 14, 16 and 20 gauge ($10 list), dis 30&10&2%
Star, Club, Rival and Climax Brands, 10-gauge, $9 list } dis 33⅓&10&2%
Star, Club, Rival and Climax Brands, 12 gauge, $8 list } dis 33⅓&10&2%
Club, Rival and Climax Brands, 14, 16 and 20 gauge....dis 30&10&2%
Selbold's Combination Shot Shells....dis 15&2%
Brass Shot Shells, 1st quality....dis 60&2%
Brass Shot Shells, Club, Rival, Climax, dis 65&2%
A. B. & C. Co., I. X. L., 10 & 12 gauge....dis 40&5&2%
A. B. & C. Co., "Special," 16 gauge...dis 30&10&5&2%
A. B. & C. Co., "Special," 10 & 12 gauge...40&10&2%
Fowler's Patent, 10 & 12 gange, ₩ 100....$3.25

Small extras given by some dealers.

Shells Loaded—
List No. 19, 1887....dis 20 & 10%

Wads—
U. M. C. & W. R. A.—B. E., 11 up...$2.00
U. M. C. & W. R. A.—B. E., 9&10...2.30
U. M. C. & W. R. A.—B. E., 7&8....2.60
U. M. C. & W. R. A.—P. E., 11 up..3.10
U. M. C. & W. R. A—P. E., 9&10..4.00
U. M. C. & W. R. A.—P. E., 7&8 ...4.90
Dis 20&2% With small extras.
Riley's B. E., 11 up....$1.75
Riley's P. E., 11 @ 20....$2.80

Anvils.—Eagle Anvils....₩ ℔ 10¢, dis 20 @ 20&5%
Peter Wright's....9½¢
Armitage's Mouse Hole....8¾¢
Armitage Mouse Hole, Extra....11¼@11¾¢
Trenton....9¼@9¾¢
Wilkinson's....9¼@10¢
J. & Riley Carr, Patent Solid....11@11½¢

Anvil Vise and Drill—
Millers Falls Co....$18.00, dis 20%
Chenev Anvil and Vise....dis 25%
Allen Combined Anvil and Vise....$3, dis 40&10%
Moore & Barnes Mfg. Co....dis 33⅓%

Apple Parers.

Advance	₩ doz. $4.75
Antrim Combination	₩ doz. 5.50
Baldwin	₩ doz. 5.25
Champion	₩ doz. 7.25
Eureka, 1888	each 17.00
Family Bay State	₩ doz. 12.00
Gem	₩ doz. 5.25
Gold Medal	₩ doz. 4.00
Hudson's New '88	₩ doz. 3.75
Ideal	₩ doz. 4.75
Improved Bay State	₩ doz. 30.00
Little Star	₩ doz. 5.00
Mouarch	₩ doz. 13.50
New Lightning	₩ doz. 5.50
Oriole	₩ doz. 4.00
Penn	₩ doz. 4.00
Perfection	₩ doz. 4.00
Pomona	₩ doz. 4.00
Rocking Table	₩ doz. 6.00
Turntable	₩ doz. 4.50
Victor	₩ doz. 13.50
Waverly	₩ doz. 4.50
White Mountain	₩ doz. 4.50
72	₩ doz. 4.25
76	₩ doz. 5.75
78	₩ doz. 6.50

Augers and Bits.

Douglass Mfg. Co.
New Haven Copper Co.
Wm. A. Ives & Co.
Humphreysville Mfg. Co.
French, Swift & Co. (F. H. Beecher) } ....dis 70%

Cook's, Douglass Mfg. Co....dis 55%
Cook's, New Haven Copper Co...dis 50&10@50&10&5%
Ives' Circular Lip....dis 60%
Patent Solid Head....dis 30%
C. E. Jennings & Co., No. 10, extension lip....dis 40%
C. E. Jennings & Co., No. 30....dis 60%
C. E. Jennings & Co., Auger Bits, in fancy boxes, ₩ set, 32¾ quarters, No 5, $5; No. 30, $2....dis 20%
Lewis' Patent Single Twist....dis 45%
Russell Jennings' Augers and Bits....dis 25%
Imitation Jennings' Bits (new list)....dis 60@6.2&5%
Pugh's Black....dis 20%
Car Bits....dis 50&10@60%
L'Hommedieu Car Bits....dis 15&10%
Forstner Pat. Auger Bits....dis 10%

Pellow Augers—
Ives } dis 25&10@25&10&5%
French, Swift & Co. } dis 25&10@25&10&5%
Douglass' } dis 25&10@25&10&5%
Bonney's Adjustable ₩ doz. $48....dis 40&10%
Stearns'....dis 20&10%
Ives' Expansive, each $6.50....dis 50&10%
Universal Expansive, each $6.50....dis 20%
Wood's....dis 25@25&10%

Expansive Bits—
Clark's small, $18; large, $26....dis 35@35&5%
Ives' No. 4, per doz., $60....dis 35@40%
Swan's....dis 40%
Steer's, No. 1, $36; No. 2, $22....dis 35%
Stearns' No. 2, $48....dis 20%

Gimlet Bits—
Common....₩ gross $2.75@$3.25
Diamond....₩ doz. $1.10, dis 25&10%
"Bee"....dis 25@25&5%
Double Cut, Shepardson's....dis 45@45&5%
Double Cut, Ct. Valley Mfg. Co....dis 30&10%
Double Cut, Hartwell's, ₩ gro....$5.25
Double Cut, Douglass'....dis 40&10%
Double Cut, Ives'....dis 60@60&5%

Bit Stock Drills—
Morse Twist Drills....dis 50&10&5%
Standard....dis 50&10&5%
Cleveland....dis 50&10&5%
Syracuse, for metal....dis 50&10&5%
Syracuse, for wood (wood list)....dis 30@30&5%
Williams' or Holt's, for metal....dis 50&10&10%
Williams' or Holt's, for wood....dis 40&10%

Ship Augers and Bits—
L'Hommedieu's....dis 15&10%
Watrous's....dis 15&10%
Snell's....dis 15&10%
Snell's Ship Auger Patt'n Car Bits, dis 15&10%
Extras often given.

Awl Hafts.
Sewing, Brass Ferrule....$3.50 ₩ gross—dis 45&10%
Patent Sewing, Short....$1.00 ₩ dos—dis 40&10%
Patent Sewing, Long....$1.20 ₩ doz.—net
Patent Peg, Plain Top....$10.00 ₩ gross—dis 45&10%
Patent Peg, Leather Top....$12.00 ₩ gross—dis 45&10%

Awls, Brad Sets, &c.
Awls, Sewing, Common....₩ gross $1.70—dis 35%
Awls, Shouldered Peg....₩ gross $2.45—dis 40@40&10%
Awls, Patent Peg....₩ gross 63¢—dis 40@40&10%
Awls, Shouldered Brad....$2.70 ₩ gross—dis 35%
Awls, Handled Brad....$7.50 ₩ gross—dis 45%
Awls, Handled Scratch....$7.50 ₩ gross—dis 35&10%
Awls, Socket Scratch....$1.50 ₩ doz—dis 25@30%

Awl and Tool Sets.
Aikon's Sets, Awls & Tools, No. 20, ₩ doz. $10—dis 55&10%
Fray's Ad Tool Hdls., Nos. 1, $12; 2, $18.; 3, $12; 4, $9. dis 25@25&10%
Miller's Falls Adj. Tool Hdls., Nos. 1, $12; 2, $18. dis 25%
Henry's Combination Haft....₩ doz. $6
Brad Sets, No. 42, $10.50. No. 43, $12.50...dis 70&10&5%
Brad Sets, Stanley's Excelsior, No. 1, $7.50. }
Brad Sets, Stanley's Excelsior, No. 2, $4.00. } dis 30&10%
Brad Sets, Stanley's Excelsior, No. 3, $5.50. }

Axes.
Makers' and Special Brands—
First quality....₩ doz, $6.00 @ $6.50
Others....₩ doz, $5.50 @ $5.75

Axle Grease.
Fraser's, in bulk....Keg ₩ ℔, 4¢; Pail, ₩ ℔, 5¢ net
Frasers, in boxes....₩ gross $9.50
Dixon's Everlasting, in bxs., ₩ doz., 1 ℔: $1.20; 2 ℔, $2
Dixon's Everlasting....10-℔ pails, each, 85¢
Lower grades, special brands....₩ gro $5.50 @ $7

Axles.—No. 1, 4¢ @ 4¼¢; No. 2, 5¼ @ 5½¢.
Nos. 7 to 18....dis 50@55%
Nos. 19 to 22....dis 60&10&10@70%
National Wrought Steel Tubular Self-Oiling:
Standard Farm (1 to 5) and Special Farm (A1 to A5)
Less than 10 sets....dis 33⅓%
Over 10 sets....dis 33⅓&5%
X Strong Exp. (6 to 9), & XX Strong Truck (10 to 16):
Less than 10 sets....dis 10%
Over 10 sets....dis 10&5%

Bag Holders.
Sprengle's Pat., ₩ doz $18....dis 60%
Balances.—Spring Balances....dis 50%
Common 24 ℔....₩ doz., $1.50—dis 50%
Chatillon's Spring Balances....dis 50%
Chatillon's Circular Spring Balances....dis 60%

Bells.
Hand—
Light Brass....dis 70&10%
Extra Heavy....dis 60&10%
White Metal....dis 60&10&10%
Silver Chime....dis 33⅓&10%
Globe (Cone's Patent)....dis 25&10@35%

Door—
Gong, Abbe's....dis 33⅓&10%
Gong, Yankee....dis 45&10%
Gong, Barton's....dis 40&10@50%
Crank, Taylor's....dis 25&10%
Crank, Brooks'....dis 50&10&2%
Crank, Cone's....dis 10%
Crank Connell's....dis 20&10%
Lever, Sargent's....dis 60&10%
Lever, Taylor's Bronzed or Plated....net
Lever, Taylor's Japanned....dis 25&10%
Lever, R. E. ₩ Co.'s....dis 50&10&2%
Pull, Brook's....dis 50&10&2%
Pull Western....dis 25&10%

Cow—
Common Wrought....dis 60&10%
Western....dis 20&10%
Western, Sargent's list....dis 70&10%
Kentucky "Star"....dis 20&10%
Kentucky, Sargent's list....dis 70&10%
Dodge, Genuine Kentucky, new list, dis 70@70&10%
Texas Star....dis 50&10@50&10&5%
Call....dis 40@40&5%
Farm Bells....₩ ℔, 3¢ @ 3½¢
Steel Alloy Church and School Bells....dis 40%
Bellows.—Blacksmiths'....dis 60&10&5@60%
Molders'....dis 40@40&10%
Hand Bellows....dis 40&10@40%

Belting, Rubber.
Common Standard....dis 70&10%
Standard....dis 70&70&5%
Extra....dis 60&10%
N. Y. B. & P. Co., Standard....dis 60&5%
N. Y. B. & P Co., Extra Standard....dis 50&10%

Bench Stops.
Morrill's....₩ doz $9—dis 50%
Hotchkiss's....₩ doz $5.00—dis 10@10&10%
Weston's, per doz No. 1, $10; No. 2, $9....dis 25&10&5%
McGill's....₩ doz $3—dis 10%

Bits.—Auger, Gimlet Bit Stock, Drills, &c., see Augers and Bits.

Bit Holders.
Extension, Barber's....₩ doz $15.00—dis 40@40&10%
Extension, Ives'....₩ doz $20.00—dis 60&5@60&10%
Diagonal....₩ doz $24.00—dis 40%
Angular....₩ doz $24.00—dis 40&5%

Blind Adjusters.
Domestic....₩ per doz $3.00—dis 33⅓%
Excelsior....₩ doz $10.00—dis 50&10&5%
Washburn's Self-Locking....dis 20@20&10%

Blind Fasteners.
Mackrell's....₩ doz pairs, $1.00—dis 20@20&10%
Van Sand's Screw Pattern....$15 ₩ gro.—dis 60&10%
Van Sand's Old Pattern....$15 ₩ gro.—dis 55&10%
Washburn's Old Pattern....$9 ₩ gro. net
Merriman's....new list, net
Austin & Eddy No. 2008....$9 ₩ gro. net
Security Gravity....$9 ₩ gro. net

Blind Staples.
Barbed, ½ in. and larger....₩ ℔ 7½@8¢ net
Barbed, ⅜ in....₩ ℔ 8½@9¢ net

Blocks.
Ordinary Tackle, list April 17, '85....dis 40%
Cleveland Block Co., Mal. Iron....dis 50%
Novelty Tackle Blocks, Mal. Iron....dis 50%

Bolts.
Door and Shutter—
Cast Iron Barrel, Square, &c....dis 70@70&10%
Cast Iron Shutter Bolts....dis 70@70&10%
Cast Iron Chain (Sargent's list)....dis 65&10%
Ives' Patent Door Bolts....dis 60%
Wrought Barrel....dis 70@70&10%
Wrought Square....dis 70@70&10%
Wr't Shutter, all Iron, Stanley's list....dis 60&10%
Wr't Shutter, Brass Knob, Stanley's....dis 40&10%
Wrought Shutter, Sargent's list....dis 60&10%
Wrought Sunk Flush, Sargent's list....dis 55&10%
Wrought Sunk Flush, Stanley's list....dis 50&10%
Wrought S.K. Flush, Com'n Stanley's list, dis 55&10%

Carriage—
Com. list June 10, '84....dis 75&2½&2%
Genuine Eagle, list Oct., '84....dis 75&10%
Philia. pattern, list Oct. 7, 84...dis 75&10@75&10&5%
R. B. & W., old list....dis 70%

Tire—
Common, list Feb. 28, 1883....dis 70%
P. C. B. & N. Co., Empire, list Feb. 28, 1883....dis 70%
P. C. B. & N. Co., Philadel., list Oct. 84....dis 82½%
P.C.B.&N.Co., Keystone, Phil. list, Oct. '84....dis 80%
P.C.B.&N.Co., Norway, Phil. list, Oct. '84, dis 75&10%
Am. S. Co., Norway, Phil., list Oct. 16, '84...dis 75&10%
Am. S. Co., Eagle, Phil., list Oct. 16, '84....dis 80%
Am. S. Co., Philadel. list, Oct. 16, 84....dis 82½%
Am. S. Co., Bay State, list Feb. 28, '83....dis 70%
R. B. & W., Philadel. list Oct. 16, 1884....dis 82%
R. & E. Mfg. Co....dis 70%

Stove and Plow—
Stove....dis 62½%
Plow....dis 60&5%
Am. S. Co. Stove, Annealed....dis 62½%
R. B. & W., Plow....dis 55%
R. B. & W., Stove....dis 62½%
R. & E. Mfg. Co. Stove....dis 62½%
Machine, according to size....dis 75&10@80%
Bolt Ends, according to size....dis 75&10@80%

Borax....₩ ℔ 9¾@10¼¢

Boring Machines.

Without Augers.	Upright.	Angular.
Douglas	$5.50	$6.75....dis 50%
Snell's, Rice's Patent	5.50	6.75.dis 40&10&10%
Jennings	5.50	6.75..dis45@45&10%
Other Machines	2.35	2.75....net
Phillips' Pat., with Augers	7.00	7.50....net

Bow Pins
Humason, Beckley & Co.'s....dis 60&10%
Sargent & Co.'s....$17 and $18, dis 60&10%
Peck, Stow & W. Co....dis 50&10@50&10&5%

Braces.
Backus, Nos. 110 to 114 and 31 to 33..dis 60&5@60&10%
Backus, Nos. 6, 8, 12, 14....dis 60&10&5%
Backus, Nos. 16, 18, 20, 29, 7 9, 11....dis 70&10&5%
Barber's, Nos. 10 to 16....dis 50%
Barber's, Nos. 30 to 33....dis 50%
Barber's, Nos. 40 to 43....dis 50&10%
Barker's, Nos. 8, 10 and 12....dis 75&10@80%
Barker's, Plated, Nos. 8, 10 and 12....dis 65&10@70%
Osgood's Ratchet....dis 40&10@50%
Spofford's....dis 50&10%
Ives' New Haven Novelty....dis 70@70&5%
Ives' New Haven Ratchet....dis 60&5@60&10%
Ives' Barber Ratchet....dis 60&5@60&10%
Ives' Barbers....dis 60&5@60&10%
Ives' Spofford....dis 60&5@60&10%
Common Ball, American....$1.10@$1.15
Bartholomew's, Nos. 25, 27, 30....dis 50&10@60&5%
Bartholomew's, Nos. 117 118, 119....dis 70@70&5%
Amidon's Barker's Imp'd Plain....dis 75&10@80%
Amidon's Barker's Imp. Nickeled....dis 65&10@70%
Amidon's Ratchet....dis 75&10@80%
Amidon's Eclipse Ratchet....dis 60%
Amidon's Globe Jawed....dis 40&40&10%
Amidon's Corner Brace....dis 40@40&10%
Amidon's Universal....8 in., $2.10; 10 in., $2.25
Amidon's Buffalo Ball....$1.10@$1.15
P. S. & W....dis 50&10%

Brackets.
Shelf, plain, Sargent's list....dis 55&10@55&10&10%
Shelf, fancy, Sargent's list....dis 60&10@60&10&10%
Reading, plain....dis 60&10@60&10&5%
Reading, Rosette....dis 60&10@60&10&10%

Bright Wire Goods.—dis 87½@87½&10%

Broilers.	½ inch	₩ 10	₩ x 13
Henis' Self-Basting	Per doz.	$4.50	5.50	6.50

Buckets.—See Well Buckets and Pails.

Bull Rings.—Union Co. Nut....dis 55%
Sargent's....dis 60¾&10@70&5%
Hotchkiss' low list....dis 30%
Humason, Beckley & Co.'s....dis 70%
Peck, Stow & W. Co.'s....dis 50&10@50&10&10%
Ellrich Hdw. Co., White Metal, low list, dis 50@50&10%

Butcher's Cleavers.
Bradley's....dis 25@30
L. & I. J. White....dis 20&5%
Beatty's....dis 40@40&5%

1	2	3	4	5	6	7	8
$16.50	19.00	$21.50	24.00	$27.00	30.00	33.50	36.50

New Haven Edge Tool Co.'s....dis 40%
P. S. & W....dis 33⅓&5@33⅓&10%

Butts.
Brass—
Wrought Brass....dis 70@70&10%
Cast Brass, Tiebout's....dis 33⅓%
Cast Brass, Corbin's Fast....dis 33⅓&10%
Cast Brass, Loose Joint....dis 33⅓&10%

Cast Iron—
Fast Joint, Narrow....dis 50&10%
Fast Joint, Broad....dis 55&10%
Loose Joint.
Loose Joint, Japanned.
Loose Joint, Jap. with Acorns.
Parliament Butts.
Mayer's Hinges.
Loose Pin, Acorns.
Loose Pin, Acorns, Japanned.
Loose Pin, Acorns, Jap, Pltd. Tips.
....dis 70&10

Wrought Steel—
Fast Joint Narrow ..... dis 70&10 %
Fast Joint, Lt. Narrow ..... dis 70&10 %
Fast Joint, Broad ..... dis 70&10 %
Loose Joint, Broad ..... dis 70&10 %
Table Butts, Back Flaps, &c ..... dis 70&10 %
Inside Blind, Regular ..... dis 70&10 %
Inside Blind, Light ..... dis 70&10 %
Loose Pin ..... dis 70&10 %
Bronzed Wrought Butts ..... dis 40&10@40&10&5 %

Calipers.—See Compasses.

Calks, Toe
Gautier ..... ℔ 5½@6¢
Dewicks ..... ℔ 5½@6¢

Can Openers.
Messenger's Comet ..... ℔ doz $3.00, dis 25 %
American ..... ℔ gross $3.00
Duplex ..... ℔ doz 25¢, dis 15 @ 20 %
Lyman's ..... ℔ doz $3.75, dis 20 %
No. 4, French ..... ℔ doz $2.25, dis 55 @ 60 %
No. 5, Iron handle ..... ℔ gross $6.00, dis 45 @ 50 %
Eureka ..... ℔ doz $2.50, dis 10 %
Sardine Scissors ..... ℔ doz $2.70@$3.00 %
Star ..... ℔ doz $2.75 %
Sprague, No. 1, $2; 2, $2.25; 3, $2.50 ..... dis 50&10&5 %
World's Best, ℔ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $36.00 ..... dis 50&10 %
Universal ..... ℔ doz $3.00, dis 35&5 %
Domestic ..... ℔ doz $2.50, dis 45 %
Champion ..... ℔ doz $2.00, dis 50 %

Cards.
Horse and Curry ..... dis 10&10 @ 10&10&10 %
Cotton ..... New list, Aug., 1883, dis 10 @ 10&10 %
Wool ..... " " " dis 10 @ 10&10 %

Carpet Stretchers.
Cast Steel, Polished ..... ℔ doz $2.25
Cast Iron, Steel Points ..... ℔ doz 80¢
Socket ..... ℔ doz $1.75
Bullard's ..... dis 25 @ 25&10 %

Carpet Sweepers.
Bissell No. 5 ..... ℔ doz $17.00
Bissell No. 7 New Drop Pan ..... ℔ doz $19.00
Bissell Grand ..... ℔ doz $36 00
Grand Rapids ..... ℔ doz $24.00
Crown Jewel ..... No. 1, $18; No. 2, $19; No. 3, $20
Magic ..... ℔ doz $15.00
Jewel ..... ℔ doz $17.00
Improved Parlor Queen, Nickeled Trimmings ..... ℔ doz $27.00
Improved Parlor Queen, Japanned Trimmings ..... ℔ doz $24.00
Excelsior ..... ℔ doz $42.00
Garland ..... ℔ doz $18.00
Parlor Queen ..... ℔ doz $24.00
Housewife's Delight ..... ℔ doz $15.00
Queen ..... ℔ doz $16.00
Queen, with band ..... ℔ doz $18.00
King ..... ℔ doz $30.00
Weed Improved ..... ℔ doz $18.00
Hub ..... ℔ doz $16.00
Cog Wheel ..... ℔ doz $16.00

Cartridges.—See Ammunition.

Casters.
Bed ..... } New list.
Plate ..... } Brass ..dis 55 @ 55&5 %
Shallow Socket ..... } Others..dis 60 @ 60&5 %
Deep Socket ..... 40&10 %
Yale Casters, list May, 1884 ..... dis 30&10@40 %
Yale, Gem ..... dis 60@60&5 %
Martin's Patent (Phœnix) ..... dis 45&10 @ 50 %
Payson's Anti-friction ..... dis 60 @ 60&10 %
"Giant" Truck Casters ..... dis 10 @ 10&5 %
Stationary Truck Casters ..... dis 45&10

Cattle Leaders.
Humason, Beckley & Co.'s ..... dis 70 %
Sargent's ..... dis 66⅔&10 %
Ratchet-less ..... dis 30 %
Peck Stow & W. Co ..... dis 50&10 %

Chain.
Trace, 6½-10-2, exact sizes, ℔ pair, $1.03 } dis 50&10@
Trace, 6½-10-3, exact sizes, ℔ pair, .92 } 50&10&5 %
Trace 7-10-2, exact sizes ... ℔ pair, 1.11 }
NOTE.—Traces, "Regular" sizes 3¢ net ℔ pair less than exact.
Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884 ..... dis 50&10 @ 50&10&5 %
American Coil 3-16 ¼ 5-16 ⅜ 7-16 ½ ⅝ ¾
In cask lots, 8.75 6.25 5.00 4.50 4.40 4.00 3.75 3.50
Less than cask lots, add ½¢@1¢ ℔ ℔.
German Coil, list of June 20, 1887 ..... dis 50&10&5@60 %
Ger. Halter Chain, list of June 20, 1887 ..... dis 50&10&5@60 %
Covert Halter, Hitching and Breast ..... dis 50&2 %
Covert Traces ..... dis 35&2 %
Oneida Halter Chain ..... dis 60 @ 60&5 %
Galvanized Pump Chain ..... ℔ 5½¢ @ 6¢
Jack Chain, Iron ..... dis 70&10 @ 75 %
Jack Chain, Brass ..... dis 65 @ 70 %

Chalk.—*White.*
Red ..... ℔ gro 50¢
Blue ..... ℔ gro 70¢
White Crayons ..... ℔ gro 12¢ @ 12½ dis 10¢

Chalk Lines.—See Lines

Chisels.
Socket Framing and Firmer—
P., S. & W. ..... } dis 75&5 @
New Haven and Middlesex ..... } 75&10 %
Mix. ..... }
Ohio Tool Co. ..... dis 75&5 %
Buck Bros. ..... dis 30 %
Merrill ..... dis 60&10@60&10&5 %
L. & I. J. White ..... dis 30 @ 30&5 %
Witherby and Douglass ..... dis 75 & 75&5 %
Tanged Firmers ..... dis 40&10 %
Tanged Firmers, Butcher's ..... $4.75 @ $5.00
Tanged Firmers, Spear & Jackson's ..... $5.00 to £
Tanged Firmers, Buck Bros ..... dis 30 %
Cold Chisels ..... ℔ 16¢ @ 19¢

Chucks.
Beach Patent ..... each, $8.00, dis 20 %
Morse's Adjustable ..... each, $7.00, dis 20 @ 20&5 %
Danbury ..... each, $6.00, dis 30 @ 30&5 %
Syracuse, Ball Pat. ..... dis 25 %

Clamps.
Providence Tool Co.'s Wrought Iron ..... dis 25 %
Adjustable, Gray's ..... dis 20 %
Adjustable, Lambert's ..... dis 20 %
Adjustable, Snow's ..... dis 40&5 %
Adjustable, Hammer's ..... dis 15 %
Adjustable, Stearns' ..... dis 20&10 %
Stearns' Adjustable Cabinet and Corner ..... dis 20&10 %
Cabinet, Sargent's ..... dis 66⅔&10 %
Carriage Makers', Sargent's ..... dis 70&10 %
Eberhard Mfg. Co ..... dis 40&5 @ 40&10 %
Warner's ..... dis 40&10 @ 40&10&5 %
Saw Clamps ..... See Vises

Clips.
Norway, Axle, ¼ & 5-16 ..... dis 55&5&5
Second grade Norway Axle, ¼ & 5-16 ..... dis 65&5
Superior Axle Clips ..... dis 66⅔&5 @ 66⅔&5&5 %
Norway Spring Bar Clips, 5-16 ..... dis 60&5&5
Wrought-Iron Felloe Clips ..... ℔ 5½¢
Steel Felloe Clips ..... ℔ 5¢
Baker Axle Clips ..... dis 25 %
Eyelets ..... dis 50 %

Cocks, Brass.—Hardware list ..... dis 40&10&2 %

Coffee Mills.
Box and Side, List revised Jan. 1, 1888 ..... dis 50&2 %
American, Enterprise Mfg. Co ..... dis 20&10@30 %
The "Swift," Lane Bros ..... dis 20&10 %

Compasses, Dividers, &c.
Compasses, Calipers, Dividers ..... dis 70@70&10 %
Semis & Call Co.'s Dividers ..... dis 60&5 %
Semis & Call Co.'s Compasses & Calipers ..... dis 50&5 %
Semis & Call Co.'s Wing & Inside or Outside ..... dis 50&5 %
Semis & Call Co.'s Double ..... dis 60 %
Semis & Call Co.'s (Call's Patent Inside) ..... dis 30 %
Excelsior ..... dis 50 %
J. Stevens & Co.'s Calipers and Dividers ..... dis 25&10 %
Starrett's Spring Calipers and Dividers ..... dis 25&10&.0 %
Starrett's Lock Calipers and Dividers ..... dis 25&1- %
Starrett's Combination Dividers ..... dis 25&10 %

Coopers' Tools.
Bradley's ..... dis 20 %
Barton's ..... dis 20@20&5 %
L. & I. J. White ..... dis 20&5 %
Albertson Mfg. Co. ..... dis 25 %
Beatty's ..... dis 40 @ 40&5 %
Sandusky Tool Co ..... dis 30 @ 30&5 %

Corkscrews.
Humason & Beckley Mfg. Co ..... dis 40 @ 40&10 %
Clough's Patent ..... dis 33⅓ @ 33⅓&5 %
Howe Bros. & Hulbert ..... dis 35 %

Corn Knives and Cutters.
Bradley's ..... dis 10 %
Wadsworth's ..... dis 25 %

Cradles.—Grain ..... dis 50&2 %

Crow Bars—Cast Steel ..... ℔ 4¢
Iron, Steel Points ..... ℔ 3½¢

Curry Combs.
Fitch's ..... dis 50&10 @ 50&10&10 %
Rubber ..... ℔ doz $10.00, dis 20 %
Perfect ..... dis %

Curtain Pins.—Silvered Glass ..... net
White Enamel ..... net

Cutlery.
Beaver Falls and Booth's ..... dis 33⅓ %
Wostenholme ..... $7.75 to £

Dampers, &c.
Dampers, Buffalo ..... dis 50 %
Buffalo Damper Clips ..... dis 50 %
Crown Damper ..... dis 40 %
Excelsior ..... dis 40&10 %

Dividers—See Compasses

Dog Collars.
Embossed Gilt, Pope & Stevens' list ..... dis 30&10 %
Leather, Pope & Stevens' list ..... dis 40 %
Brass, Pope & Stevens' list ..... dis 40 %

Door Springs.
Torrey's Rod, regular size ..... ℔ doz $1.30
Gray's ..... ℔ gro, $20.00, dis 20 %
Rev. Rod ..... ℔ gro, $20.00, dis 20 %
Warner's No. 1, ℔ doz, $2.50; No. 2, $3.30, dis 40&10&5 %
Gem Coil), list April 19, 1886 ..... dis 10 %
Star (Coil), list April 19, 1886 ..... dis 20 %
Victor (Coil) ..... dis 60 @ 60&10 %
Champion (Coil) ..... dis 60&10 @ 60&10&10 %
Philadelphia ..... 5 in., $5.00; 8 in., $7.75, dis 30 %
Cowell's ..... No. 1, ℔ doz $18.00; No. 2, $15.00, dis 50 %
Rubber, complete ..... ℔ doz $4.50, dis 55&10 %
Hercules ..... dis 50 %
Shaw Door Check and Spring ..... dis 25 @ 30 @ 30 %
Elliott's Door Check and Spring ..... dis 25 %

Drawing Knives.
P., S. & W. ..... } dis 75&5 @
Mix. ..... } 75&10 %
New Haven and Middlesex ..... }
Merrill ..... dis 60&10&10 %
Witherby and Douglass ..... dis 75@75&5 %
Watrous ..... dis 15&10 @ 25 %
L. & I. J. White ..... dis 20&5 %
Bradley's ..... dis 35 %
Adjustable Handle ..... dis 25 @ 33⅓ %
Wilkinson's Folding ..... dis 25 @ 25&5 %

Drills and Drill Stocks.
Blacksmiths' ..... each, $1.75
Blacksmiths' Self-Feeding ..... each, $7.50, dis 20 %
Breast, P. S. & W. ..... dis 40&10 %
Breast, Wilson's ..... dis 30&5 %
Breast, Millers Falls ..... each, $3.00 dis 25 %
Breast, Bartholomew's ... each, $2.50, dis 25&10 @ 40 %
Ratchet, Merrill's ..... dis 20 @ 20 & 5 %
Ratchet, Ingersoll's ..... dis 25 %
Ratchet, Parker's ..... dis 20 @ 20@25 %
Ratchet, Whitney's ..... dis 20&10 %
Ratchet, Weston's ..... dis 20@25 %
Ratchet, Moore's Triple Action ..... dis 25 @ 30 %
Whitney's Hand Drill, Plain, $11.00, Adjustable, $12.00 ..... dis 20&10 %
Wilson's Drill Stocks ..... dis 1' %
Automatic Boring Tools ..... each, $1.75 @ $1.86
Twist Drills—
Morse ..... dis 50&10&5 %
Standard ..... dis 50&10&5 %
Syracuse ..... dis 50&10&5 %
Cleveland ..... dis 50&10&5 %
Williams ..... dis 50&10&10 %

Drill Bits.—See Augers and Bits.

Drill Chucks.—See Chucks.

Dripping Pans.—Small sizes ..... ℔ 6¾¢
Large sizes ..... ℔ 6¼ ¢

Egg Beaters.
Dover ..... ℔ doz., $2.00
National ..... ℔ doz $4.50, dis 33⅓ %
Family "T. & S. Mfg. Co.) ..... ℔ gro, $17.00@$18.00 %
Kinsley (Standard Co.) ..... ℔ gro, $6.50
Acme (Standard Co. ..... ℔ gro, $6.00
Duplex (Standard Co.) ..... ℔ gro, $15.00
Duplex, extra heavy ..... ℔ doz extra $5 00
Rival (Standard Co.) ..... ℔ gro, $ 2.00
Triumph (T. & S. Mfg. Co.) ..... ℔ gro, 10.50@$11.50
Advance No. 1 ..... ℔ gro $10.50
Advance, No. 2 ..... ℔ gro $10.00
Bryant's ..... ℔ gro $15.00
Ayres' Spiral ..... ℔ gro $5
Double (Hamblin & Russell Mfg Co.) ..... ℔ gro, $16 20
Easy (Hamblin & Russell Mfg. Co.) ..... ℔ gro, $14.00
Triple (Hamblin & Russell Mfg. Co.) ..... ℔ gro, $16.20
Spiral (Hamblin & Russell Mfg. Co.) ..... ℔ gro, $4.50
Paine, Diehl & Co's ..... ℔ gro $24.00

Egg Poachers.
Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No 2, $9.00 ..... dis 25 %

Electric Bell Sets.—Wollensak's ..... dis 15 %
Bigelow & Dowse ..... dis 20 %

Emery	No. 4 to 46 gr.	No. 54 to 150 gr.	Flour, CF FF.
Kegs, ℔ ℔	4 ¢	5 ¢	2½¢
½ kegs, ℔ ℔	4½¢	5½¢	2¾¢
¼ kegs, ℔ ℔	4½¢	5½¢	3 ¢
10 ℔ cans, 10 in case	6 ¢	6½¢	5 ¢
10 ℔ cans, less than 10	10 ¢	10 ¢	7½¢

Enameled and Tinned Ware.—See Hollow-Ware.

Escutcheon Pins.
Iron, list Nov. 11, 1885 ..... dis 50&10 @ 50&10&5 %
Brass ..... dis 60 @ 60&5 %

Escutcheons.
Door Lock ..... Same discounts as Door Locks
Brass Thread ..... dis 60 @ 60&10 %
Wood ..... dis 25 %

Faucets.
Fenn's ..... dis 40 %
Bohren's Patent Rubber Ball ..... dis 25 %
Fenn's Cork Stops ..... dis 33⅓ %
Star ..... dis 60 %
Frary's Patent Petroleum ..... dis 40&5&2 %
West's Patent Key ..... dis 60&10 %
Another Lock ..... dis 45 %
Metallic Key, Leather Lined ... dis 60 &10 @ 60&10&10 %
Cork Lined ..... dis 70 &5 @ 70&10 %
Burnside's Red Cedar ..... dis 50 %
Burnside's Red Cedar, bbl. lots ..... dis 50&10 %
J. Sommer's Peerless Best Block Tin Key ..... dis 40 %
J. Sommer's IXL, 1st quality, Cork Lined ..... dis 50 %
J. Sommer's Diamond Lock ..... dis 40 %
J. Sommer's Perfection, Fla. Red Cedar ..... dis 50 %
J. Sommer's Goodenough Cedar ..... dis 60 %
Self-Measuring, Enterprise ... ℔ doz $36.00—dis 20&10 %
Self-Measuring, Lane's ..... ℔ doz $36.00—dis 25&10 %
Self-Measuring, Victor ..... ℔ doz $36.00—dis 25&10 %

Felloe Plates. ..... ℔ ℔ 6 @ 6½¢

Fifth Wheels.—Derby and Cincinnati ..... dis 45&5 %

Files.
Domestic—
Nicholson Files, Rasps, &c ..... dis 60&5 @ 60&10 %
Nicholson (X. F.) Files ..... dis 25 %
Nicholson's Royal Files (Seconds) dis 75 (extra prices on certain sizes.)
Other makers, best brands ..... dis 60&5 @ 60&10&5 %
Fair brands ..... dis 60&10&10 @ 70 %
Second quality ..... dis 70&5 @ 75 %
Heller's Horse Rasps ..... dis 50&7½ @ 50&10 %
McCaffrey's Horse Rasps ..... dis 50&10 %
Imported—
J. & Riley Carr ..... List, April 1, 1883, dis 15 %
J. & Riley Carr Horse Rasps ..... dis 10 %
Moss & Gamble ..... List April 1, 1883, dis 15 %
Butcher ..... Butcher's list, dis 20 %
Stubs ..... Stubs list, dis 25 @ 30 %
Turton's ..... Turton's list dis. 20 @ 25 %
Grover's Horse Rasps ..... American list dis 60 %

Fluting Machines.
Knox, 4½ inch Rolls ..... $3.25 each } dis 35 %
Knox, 6-inch Rolls ..... $3.60 each }
Eagle 3½ inch Roll ..... $2.15, dis 35 %
Eagle, 5½ inch Roll ..... 2.85, dis 35 %
Crown, 4½ in., $3.50; 6-in, $4.00; 8-in., $6.50 each, dis 35 %
Crown Jewel ..... 6-in, $2.50 each, dis 35 %
American, 5-in., $3; 6-in., $3.40; 7-in., $4.50 each, dis 35 %
Domestic Fluter ..... $1.50 each, net
Geneva Hand Fluter, White Metal ... ℔ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15; 2, $12.50; 3, $10, dis 30 %
Shepard Hand Fluter, No. 85 ..... ℔ doz $15.30, dis 40 %
Shepard Hand Fluter, No. 110 ..... ℔ doz $11, dis 40 %
Shepard Hand Fluter, No. 95 ..... ℔ doz $8, dis 40 %
Clark's Hand Fluter ..... ℔ doz $15.00, dis 35 %
Combined Fluter and Sad Iron ... ℔ doz $15.00, dis 30 %
Buffalo ..... ℔ doz $10.00 dis 10 %

Fluting Scissors ..... dis 45 %

Fodder Squeezers.
Blair's ..... ℔ doz $2.00
Blair's, "Climax" ..... ℔ doz $1.25

Forks.—Hay, Manure, &c., Asso. list ..... dis 65&5 %
Hay, Manure, &c., Phila. list ..... dis 60 @ 60&5 %
Plated, see Spoons.

Freezers, Ice Cream.
Buffalo Champion ..... dis 60&10&5 %
Shepard's Lightning ..... dis 65 %
White Mountain ..... dis 60 %

Fruit and Jelly Presses.
Enterprise Mfg. Co ..... dis 20&10 @ 30 %
Ferris ..... ℔ doz $4.50
P. D. & Co ..... ℔ doz $4.50
Shepard's Queen City ..... dis 40 %

Fry Pans.
High List.

No.	0	1	2	3	4	5	6	7	8
℔ doz.	$3.75	4.70	5.30	5.95	6.55	7.50	8.75	10.00	11.25

Low List ..... dis 65&10 %

No	0	1	2	3	4	5	6	7	8
℔ doz	$3.00	3.75	4.25	4.75	5.25	6 00	7.00	8.00	9.00

Fuse. ℔ 1000 ft.
Common Hemp Fuse, for dry ground $2.70
Common Cotton Fuse, for dry ground 2.85
Single Taped Fuse, for wet ground 4.75
Double Taped Fuse, for very wet ground 6.00
Triple Taped Fuse, for very wet ground 7.25
Small Gutta Percha Fuse, for water 7.50
Large Gutta Percha Fuse, for water 12.00

Gauges.
Marking Mortise, &c ..... dis 60&10 %
Starrett's Surface, Center and Scratch ..... dis 25&10 %
Wire, low list ..... dis 10&10 %
Wire, Wheeler, Madden & Co ..... dis 10 %
Wire, Morse's ..... dis 50 @ 50&5 %
Wire, Brown & Sharpe's ..... dis 10 @ 20 %

Gimlets.—Nail and Spike ..... dis 50&10&5 %
"Eureka" Gimlets ..... dis 40&10 %
"Diamond" Gimlets ..... ℔ gross $5.00
Double Cut, Shepardson's ..... dis 45 @ 45&5 %
Double Cut, Ives' ..... dis 60 @ 60&5 %
Double Cut, Douglass' ..... dis 40&10 %
"Bee" ..... ℔ gross $12, dis 25 @ 25&5 %

Glue.—Le Page's Liquid ..... dis 25 @ 25&5%
Upton's Liquid ..... dis 35 %

Glue Pots.
Tinned and Enameled ..... dis 40&5 @ 40&10%
Family, Howe's "Eureka" ..... dis 40 %
Family, L. V. & C.'s "Handy" ..... dis 50 %

Grindstones
Small at factory ..... ℔ ton $7.50 @ 9.0

Grindstone Fixtures.
Sargent's Patent ..... dis 70&10 %
Reading Hardware Co ..... dis 30&10 %

Hack Saws.—See Saws.

Halters.—Covert's, Rope, ¼-in. Jute ..... dis 50&2 %
Covert's, Rope, ¼-in., Hemp ..... dis 40&2 %
Covert's Adj. Rope Halters ..... dis 40&2 %
Covert's Hemp Horse and Cattle Tie ..... dis 50&2 %
Covert's Jute Horse and Cattle Ties ..... dis 60&10&2 %

Hammers.
Handled Hammers.
Maydole's ..... List Dec. 1, 1885, dis 25 @ 25&1 %
Buffalo Hammer Co ..... } List Jan. 15, '87
Humason & Beckley ..... } Dis. 50 @ 50&
Atha Tool Co ..... } 10 %
Fayette R. Plumb ..... dis 40&10 @ 50
C. Hammond & Son ..... dis 40&10&50
Verree ..... dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 & 1.75 ..... dis 30&10 %
Nelson Tool Works ..... dis 40&10 %
Warner & Nobles ..... dis 20 @ 25 %
Peck, Stow & Wilcox ..... dis 40 %
Sargent's ..... dis 33⅓&10 %
Heavy Hammers and Sledges—
3 ℔ and under ..... ℔ ℔ 40¢ } dis 70 & 10
3 to 5 ℔ ..... ℔ ℔ 36¢ } @ 75 %
Over 5 ℔ ..... ℔ ℔ 30¢ }
Wilkinson's Smiths' ..... 10½¢ @ 11¢ ℔ ℔

Hand Cuffs and Leg Irons
Providence Tool Co., Hand Cuffs, $15.00 ℔ doz ..... dis 10%
Providence Tool Co., Leg Irons, $25.00 ℔ doz ..... dis 10%
Tower's ..... dis 25 %
Daley's Improved Hand Cuffs: 2 Hands, Polished, ℔ doz, $48 Nickeled, $57; 3 Hands, Polished, ℔ doz. $72; Nickeled, $84 ..... dis 25 %

Handles.
Iron, Wrought or Cast.—
Door or Thumb.

Nos.	0	1	2	3	4	
Per doz.	$0.90	1.00	1.18	1.35	1.50	dis 60&10&10

Roggin's Latches ..... ℔ doz. 30¢ @ 3
Bronze Iron Drop Latches ..... dis 70¢ net
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88 ..... net
Barn Door ..... ℔ doz. $1.40, dis 10&10 %
Chest and Lifting ..... dis 70 %
Handles, Wood—
Saw and Plane ..... dis 40&10 @ 40&10&5 %
Hammer, Hatchet, Axe, Sledge, &c ..... dis 35 %
Brad Awl ..... ℔ gross $2.00

Hickory Firmer Chisel, assorted....₱ gross 4.50
Hickory Firmer Chisel, large.....₱ gross 5.00
Apple Firmer Chisel, assorted.....₱ gross 5.00 } dis 40 & 10 %
Apple Firmer Chisel, large.....₱ gross 6.00
Socket Firmer Chisel, assorted.....₱ gross 3.00 } dis 40 & 10 %
Socket Framing Chisel, assorted.....₱ gross 5.00
J. B. Smith Co.'s Pat. File.....dis 50 %
File, assorted.....₱ gross 2.75 } dis 40 @ 40&10 %
Auger, assorted.....₱ gross 5.00
Auger, large.....₱ gross 7.00
Patent Auger, Ives'.....dis 30&10 %
Patent Auger, Douglass'.....₱ set $1.25 net
Patent Auger, Swan's.....₱ set $1.00 net
Hoe, Rake, Shovel, &c.....dis 50&10 %

Cross Cut Saw Handles—
Atkins' No. 1 Loop, ₱ pair, 30¢ No. 3, 22¢; No. 2 and No. 4 Reversible, 22¢.
Boynton's Loop Saw Handles.....50¢, dis 60 %
Champion.....15¢

Hangers.
Barn Door, old patterns.....dis 60&10&10 @ 70 %
Barn Door, New England.....dis 60&10&10 @ 70 %
Samson Steel Anti-Friction.....dis 55 %
Orleans Steel.....dis 55 %
Hamilton Wrought Wood Track.....dis 55 %
U. S. Wood Track.....dis 60 %
Champion.....dis 60&10 %
Rider and Wooster, Medina Mfg. Co.'s list.....dis 7
Climax Anti-Friction.....dis
Climax Steel Anti-Friction.....dis 50 %
Zenith for Wood Track.....dis 55 %
Reed's Steel Arm.....dis 50 %
Challenge, Barn Door.....dis 50 %
Sterling Improved (Anti-Friction).....dis 55&10 %
Victor, No. 1, $15; No. 2, $16.50; No. 3, $18...dis 50&2 %
Cheritree.....dis 50&10 %
Kidder's.....dis 50&10 @ 60 %
The "Boss".....
Best Anti-Friction.....dis 60 %
Duplex (Wood Track).....dis 60 %
Terry's Patent.....₱ dos. pr. 4 in. $10; 5 in., $12.....dis 50&5 %
Cronk's Patent....No. 4, $12; No. 5, $14.40; No. 6, $18.....dis 50&10 @ 60 %
Wood Track Iron Clad.....₱ ft. 10¢, dis 50&10 @ 60 %
Carrier Steel Anti-Friction.....dis50 @ 50&5 %
Architect.....₱ set $6.00, dis 20 %
Eclipse.....dis 20&10
Felix.....₱ set $4.50, dis 20 %
Richards'.....dis30@30&10 %
Lane's Steel Anti-Friction.....dis 40&10 %
The Ball Bearing Door Hanger....dis 20&10 @ 25&10 %
Warner's Patent.....dis 20@20&10 %
Stearns' Anti-Friction.....dis 20 @ 20&10 %
Stearns' Challenge.....dis 25&10 @ 25&10&10 %
Faultless.....dis 40 @ 40&5 %
American.....₱ set $6; dis 20&10 %
Rider & Wooster, No. 1, 62½¢; No. 2, 75¢.....dis 40 %
Paragon, Nos. 1, 2 and 3.....dis 40&10 %
Paragon, Nos. 5, 5½, 7 and 8.....dis 20&10 %
Crescent.....dis 60@60&10 %
Nickel, Cast Iron.....dis 50 %
Nickel, Malleable Iron and Steel.....dis 40 %
Scranton Anti Friction Single Strap.....dis 33⅓ %
Scranton Anti-Friction Double Strap.....dis 40 %
Universal Anti Friction.....dis 40 %
Wild West, 4 in. wheel, $15; 5 in. wheel, $21...dis 45 %
Star.....dis 4 &10 @ 40&10&5 %
May.....dis 50&5 @ 60&10 %

Harness Snaps.—See Snaps.

Hatchets.—List Jan. 1, 1886.

Isaiah Blood.....dis 35 @ 40%
Hunt's Shingling Lath and Claw.....dis 40&5 %
Hunt's Broad.....dis 40 %
Buffalo Hammer Co.....dis 40&10@50 %
Hurd's.....dis 40&10 @ 50 %
Fayette R. Plumb.....dis 40&10 @ 50 %
Wm. Mann, Jr., & Co.....dis 50 @ 50&5 %
Underhill Edge Tool Co.....dis 40&5 @ 40&10 %
Underhill's Haines and Bright goods.....dis 33⅓ %
C. Hammond & Son.....dis 40&10 @ 50 %
Simmons.....dis 40&10 @ 50 %
Peck's.....dis 40&10 @ 40&10&5 %
Kelly's.....dis 50@50&5 %
Sargent & Co.....dis 50 %
Ten Eyck Edge Tool Co.....dis 40&10@40&10&5 %
Collins, following list.....dis 10 %

Shingling, Nos. 1 2 3	₱ doz	$5.50	$6.00 $6.50
Claw, Nos. 1 2 3	₱ doz	6.00	6 50 7.00
Lathing Nos. 1 2 3	₱ doz	5.50	6.00 6.50

Hay Knives.
Lightning.....Mfrs. price ₱ doz $18, dis 25 % Jobber's Extras
Electric.....₱ doz $17 } dis 30 @ 40&10 %
Gem.....₱ doz $18
Wadsworth's.....dis 40&7½ @ 40&10 %
Carter's Needle.....₱ doz $11.50 @ $12.00
Heath's.....₱ doz $13.50 @ $14.00

Hinges.
Wrought Iron Hinges—
Strap and T.....dis 70&10 &5 @ 70&10&10 %
Screw Hook and Strap.....6 to 12 in. ₱ ₱.....3¾¢
14 to 20 in., ₱ ₱.....5½¢
22 to 36 in., ₱ ₱.....8½¢
Heavy Welded Hook.....6 to 12 in., ₱ ₱.....3¾¢
14 to 20 in., ₱ ₱.....5½¢
22 to 36 in., ₱ ₱.....8½¢
Screw Hook and Eye.....¾ in....₱ doz $1.50
⅝ in....₱ doz $2.45 } dis 10%
½ in....₱ doz $3.80
Rolled Blind Hinges, Nos 32 and 34.....dis 50&10 %
Rolled Blind Hinges, Nos. 232 and 234.....dis 55&10 %
Rolled Plate.....dis 70&10 %
Rolled Raised.....dis 70&10 %
Plate Hinges 8, 10 & 12 in., ₱ ₱.....5
"Providence" over 12 in., ₱ ₱.....4½

Spring Hinges—
Geer's Spring and Blank Butts.....dis 40 %
Union Spring Hinge Co.'s list, March, 1886...dis 20 %
Acme and U. S.....dis 30 %
Empire and Crown.....dis 20 %
Hero and Monarch.....dis 50 %
American, Gem, and Star, Japanned.....dis 20 %
American, Gem, and Star, Bronzed.....net
Oxford, Bronze and Brass.....net
Barker's Double Acting.....dis 20&10 %
Union Mfg. Co.....dis 25 %
Bommer's.....dis 30 %
Buckman's.....dis 15@20 %
Chicago.....dis 30 %

Gate Hinges—
Western.....₱ doz $4.40, dis 55 %
N. E.....₱ doz $7.00, dis 55 %
N. E. Reversible.....₱ doz $5.20, dis 55&10 %
Clark's, Nos. 1 2 3.....dis 60&10&5 %
N. Y. State.....₱ doz $5.00, dis 55&10 %
Automatic.....₱ doz $12.50, dis 50 %
Common Sense.....₱ doz pair $4.50, dis 50 %
Seymour's.....dis 45&10 %
Shepard's.....dis 60&10&5 %
Reed's Latch and Hinges.....₱ doz sets $12, dis 50 %

Blind Hinges—
Parker.....dis 75&2 %
Palmer.....dis 50&5&10 %
Seymour.....dis 70&2 %
Nicholson.....dis 45&10 %
Huffer.....dis 50 %
Clark's, Nos. 1, 3, 5, 40 and 50.....dis 75&10&5@80 %
Clark's Mortise Gravity.....dis 50 %
Sargent's, Nos. 1, 3, 5, 11, 13...dis 75&10@75&10&5 %
Sargent's, No. 12.....dis 75&10&10 %
Reading's Gravity.....dis 75&10 @ 75&10&5 %
Shepard's Noiseless Niagara, Buffalo, Champion, Steamboat, Clark's Old Pattern and Clark's Tip Pattern.....dis 75&10&5 %
Shepard's O. S., Lull & Porter.....dis 75&10 %
Shepard's Acme, Lull & Porter.....dis 75&5 %
Shepard's Queen City Reversible.....dis 75 %
Clark's Lull & Porter, Nos. 0, 1, 1½, 2, 2½, 3.....dis 75&10&2½ %
North's Automatic Blind Fixtures, No. 2, for Wood, $10.50; No. 3, for Brick, $13.50....dis 25&2 %

Hoes.
Handled—
Garden, Mortar, &c.....dis 65&5 %
Planter's, Cotton, &c.....dis 65&5 %
Warren Hoe.....dis 60 %
Magic.....₱ doz $4.75

Eye—
D. & H. Scovill.....dis 20 %
Lane's Crescent Scovil Pattern.....dis 45 %
Lane's Crescent Planters Pattern.....dis 45 & 5 %
Lane's Razor Blade, Scovil Pattern.....dis 30 %
Maynard, S. & O. Pat.....dis 45&5 %
Sandusky Tool Co., " "
Hubbard & Co., " "
Ba.e " "
Grub.....dis 60 @ 60&10 %

Hog Rings and Ringers.
Hill's Improved Ringers.....₱ dos. $4.50
Hill's Old Style Ringers.....₱ dos. $3.00
Hill's Tongs.....₱ dos, $4.50
Hill's Rings.....₱ dos boxes, $2.25 @ 2.40
Perfect Rings.....₱ dos boxes $1.75 @ 2.00
Perfect Rings.....₱ doz. $2.50
Blair's Hog Ringers.....₱ doz, $2.60 @ $2.65
Blair's Hog Rings.....₱ doz 95¢ @ 1.00
Champion Ringers.....₱ doz $2.00
Champion Rings, Double.....₱ doz, $2.25
Brown's Ringers.....₱ doz, $2.00
Brown's Rings.....₱ doz, $1.25 @ 1.30

Hoisting Apparatus
"Moore's" Hand Hoist, with Lock Brake.....dis 20 %
"Moore's" Differential Pulley Block.....dis 40 %

Holders, File and Tool.
Bailz Pat.....₱ doz $4; dis 25 %
Nicholson File Holders.....dis 20 %

Hollow-Ware.
Iron—
Stove Hollow-Ware. Ground...dis 60&10@60&10&5 %
Stove Hollow-Ware. Unground....dis 70&5@70&10 %
Enameled and Tinned Hollow-Ware—
Kettles.....dis 70 @ 70&5 %
Oval Boilers, Saucepans & Glue Pots.....dis 40&5 @ 40&10 %
Gray Enameled Ware.....dis 10 @ 40&5 %
Agate and Granite Ware.....dis 25 %
Rustless Hollow-Ware.....dis 50 @ 50&5 %
Galvanized Tea-Kettles—

Inch	6	7	8	9
Each	55¢	60¢	65¢	75¢

Silver Plated—4 mo. or 5 % oash in 30 days.
Reed & Barton.....dis 40&5 %
Meriden Brittania Co.....dis 40&5 %
Simpson, Hall, Miller & Co.....dis 40&5 %
Rogers & Brother.....dis 40&5 %
Hartford Silver Plate Co.....dis 40&5&5 %
William Rogers Mfg. Co.....dis 40&5&5 %

Hooks.
Cast Iron—
Bird Cage. Sargent's list.....dis 60&10&10 %
Bird Cage, Reading.....dis 60&10&10 %
Clothes Line, Sargent's list.....dis 60&10&10 %
Clothes Line, Reading list. dis 60&10 @ 60&10&10 %
Ceiling, Sargent's list.....dis55&10&10 %
Harness, Reading list.....dis 55&10 @ 55&10&10 %
Coat and Hat, Sargent's list.....dis 55&10 @ 60&10 %
Coat and Hat, Reading.....dis 60&10 @ 50&10&10 %
Wrought Iron—
Cotton.....₱ dos $1.25
Cotton Pat. (N. Y. Mallet & Handle W'ks).....dis 30 %
Tassel and Picture (T. & S. Mfg. Co.).....dis 50 %
Wrought Staples, Hooks, &c.....See Wrought Goods
Bench Hooks.....See Bench Stops
Wire—
Wire Coat and Hat, Gem, list April, 1886.....dis 45 %
Wire Coat and Hat Miles', list April, 1886.....dis 45
Indestructible Coat and Hat.....dis. 45 %
Wire Coat and Hat, Standard.....dis 45 %
Belt.....dis 75&10 @ 80 %
Grass.....₱ dos $2.00
Sush.....dis 55 @ 60 %
Whiffletree—Patent.....dis 55 %
Hooks and Eyes—Malleable Iron.....dis 70 @ 70&10 %
Hooks and Eyes—Brass.....dis 60&10&10 %
Fish Hooks, American.....dis 50 %

Horse Nails.

Nos.	6	7	8	9	10	
Ausable	24¢	26¢	25¢	24¢	23¢	dis 25&10@25&10&10 %
Clinton, Fin	24¢	22¢	21¢	20¢	19¢	dis 40&10 @ 50 %
Essex	28¢	26¢	25¢	24¢	23¢	dis25&10@25&10&10
Lyre	25¢	23¢	22¢	21¢	20¢	dis 40&10&5@50 %
Snowden	25¢	23¢	22¢	21¢	20¢	dis 40&10&5@50 %
Putnam	24¢	22¢	21¢	20¢	19¢	dis 5&10&2½&2½ %
Vulcan	23¢	21¢	20¢	19¢	18¢	dis 12½&5
Northwest'n	25¢	23¢	22¢	21¢	20¢	dis 10&10&5&5 %
Globe	23¢	21¢	20¢	19¢	18¢	dis 12½&5&5 %
A. C.	25¢	23¢	22¢	21¢	20¢	dis 25&10 @ 33⅓&5 %
C. B.-K.	25¢	23¢	22¢	21¢	20¢	dis 25&10 @ 33⅓&5 %
Champlain	28¢	26¢	25¢	24¢	23¢	dis25&10&10 %
New Haven	28¢	26¢	25¢	24¢	23¢	dis25&10@25&10&10 %
Sarnia	28¢	26¢	25¢	24¢	23¢	dis 30&10 %
Champion	25¢	23¢	22¢	21¢	20¢	dis 10&10&10 %
Capewell	28¢	26¢	25¢	24¢	23¢	dis 35&5 @ 35&10 %
Star	23¢	21¢	20¢	19¢	18¢	dis 40&10@10&12½ %
Anchor	23¢	21¢	20¢	19¢	18¢	dis 35 %
Western	23¢	21¢	20¢	19¢	18¢	dis 40&10 %
Empire Bronzed						14 per lb.

Horse Shoes.—See Shoes, Horse.

Hose, Rubber, competition...75&10 & 75&10&5 %
Standard.....dis 70&7 &10 %
Extra.....dis 60 @ 60&10 %
N. Y. R. & P. Co., Para.....dis 50&10 %
N. Y. R. & P. Co., Extra.....dis 50 %
N. Y. R. & P. Co., Dundee.....dis 60&10&5 %

Huskers.
Blair's Adjustable.....₱ gross $8.00
Blair's Adjustable Clipper.....₱ gross 7.00

Jack Screws.—See Screws.

Kettles.

Brass. 7 to 17 in., ₱ ₱.	Spun. 24¢	Stamped. 21 ¢
Brass larger than 17 inches, ₱ ₱.	26¢	23½¢
Enameled and Tea Kettles		See Hollow-Ware

Keys.
Lock Asso'n list Dec. 30, 1886.....dis 50&10 @ 60&5 %
Eagle, Cabinet, Trunk and Padlock.....dis 33⅓&2 %
Hotchkiss' Brass Blanks.....dis 40 %
Hotchkiss' Copper and Tinned.....dis 40 %
Hotchkiss' Padlock and Cabinet.....dis 35 %
Ratchet Bed Keys.....₱ doz $4.00, dis 15 %

Knife Sharpeners.
Parkin's Applewood Handles.....₱ doz $6.00, dis 40 %
Parkin's Rosewood or Cocobolo...₱ doz $9.00, dis 40 %

Knives.
Wilson's Butcher Knives.....dis 20 @ 25 %
Ames' Butcher Knives.....dis 25 %
Nichols' Butcher Knives.....dis 40&10
Ames' Shoe Knives.....dis 20@25 %
Ames' Bread Knives.....₱ doz $1.50, dis 15 @ 20 %
Moran's Shoe and Bread Knives.....dis 20 %
Hay and Straw.....See Hay Knives
Table and Pocket.....See Cutlery

Knobs.
Door Mineral.....65@68¢
Door Por. Jap'd.....75@78¢
Door Por. Por. Nickel.....$2.00 @ 2.25
Door Por. Plated, Nickel.....$2.00 @ 2.25
Drawer, Porcelain.....dis 55&10&10@60&10&10 %
Hemacite Door Knobs, new list.....dis 40&10@50 %
Yale & Towne Wood Knobs, list Dec., 1885....dis 40 %
Furniture Plain.....75¢ gross inch. dis 10 %
Furniture, Wood Screws.....dis 25&10 %
Base, Rubber Tip.....dis 70&10&5 %
Picture, Judd's.....dis 60&10&10 @ 70 %
Picture, Sargent's.....dis 70&10 %
Picture, Hemacite.....dis 35&5 %
Shutter, Porcelain.....dis 65&10 %
Carriage, Japanned.....₱ gross 80¢, dis 60&10 %

Ladies.
Melting, Sargent's.....dis 55&10%
Melting, Reading.....dis 35&10%
Melting, Monroe's Patent.....₱ doz. $4.00, dis 40%
Melting, P. S. & W.....dis 35&10 @ 40%
Melting, Warner's.....dis 30%

Lawn Mowers.
Standard List.....dis 50&10 %
Enterprise.....dis 60&10 %

Lanterns.
Tubular, Plain, with Guards.....₱ doz $4.00 @ $4.25
Tubular, Lift Wire, with Guards...₱ doz $4.50 @ $4.75
Tubular, Square Plain, with Guards, ₱ doz $4.00 @ $4.25
Tubular, Sq Lift Wire, with Guards, ₱ doz $4.25 @ $4.50
Without Guards, 25¢ ₱ dozen less.
Police, Small, $6.00; Med. $7.25; Large, $9.75. dis 20@25%

Lemon Squeezers.
Porcelain Lined, No. 1.....₱ doz. $6.00, dis 25&30 %
Wood, No. 2.....₱ doz. $3.00, dis 35 %
Wood, Common.....₱ doz $1.70 @ 1.75
Dunlap's Improved.....₱ doz. $3.75, dis 20 %
Sammis'.....No. 1, $5; 2, $9; 12, $13 ₱ doz. dis 25&10 %
Jennings' "Star".....₱ doz $2.50
The "Boss".....₱ doz $2.50
Dean's.....Nos. 1, ₱ doz $6.50; 2, $8.35; 3, $1.90
Little Giant.....dis 50 @ 50&5 %
King.....dis 40&5 %

Linens.
Cotton and Linen Fish, Draper's.....dis 50 %
Draper's Chalk.....dis 60 %
Draper's Mason's Linen, 84 ft., No. 1, $1.25; No. 2, $1.75; No. 3, $2.25; No. 4, $2.75; No. 5, $3.25..dis 25 %
Cotton Chalk.....dis 55 %
Samson, Cotton, No. 4, $2; No. 4½, $2.50.....dis 10 %
Silver Lake, Braided, Nos. 0, $6.00 No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₱ gross.....dis 25 %
Masons' Linen, No. 3½, $1.50; No. 4, $2; No. 4½, $2.50
Masons' Colored Cotton.....dis 45
Wire Clothes, No. 18, $3.60; No 19, $3.00; No. 20, $2.50.
Ventilator Cord, Crimson Braided, White or Drab Cotton.....$7.50 ₱ doz. dis 20%

Locks, Padlocks, Cabinet Locks, &c.
Door Locks, Latches, &c.—
List. Dec. 30, '86, chgd Feb. 2, '87...dis 50&10 @ 60&5 %
Mallory, Wheeler Co., list, July, 1888...dis 50&10@60 %
Sargent & Co. (list Aug 1, 1888).dis 55&2&10 @ 60&10 %
Reading Hardware Co. (list Feb. 2, '88).dis 55@60&10 %
Livingston & Co.....dis 70 %
Note.—Lower net prices often made.
Perkins' Burglar Proof.....dis 60&25 %
Plate.....dis 33⅓&2 %
F. Man's "Extension Cylinder".....$10.50 ₱ doz
Barnes Mfg. Co.....dis 40 %
Yale Corrugated Key.....dis 33⅓ %
Diets Flat Key.....dis 30 %
L. & C. Round Key Latches.....dis 30&10 %
L. & C. Flat Key Latches.....dis 33⅓&10 %
Romer's Night Latches.....dis 15 %
Yale new list.....dis 33⅓ %
"Shepardson" or "U. S.".....dis 35 %
"Welter" or "American".....dis 40&10 %
Reed's N. Y. Hasp Lock.....dis 25 %

Cabinet—
Eagle, Gaylord Parker and Corbin,.....} List March, '84, revised Jan. 1, '85, dis 33⅓&2 %
Deitz, Nos. 36 to 39.....dis 40 %
Deitz, Nos. 51 to 63.....dis 40 &10 %
Diets, Nos. 86 to 96.....dis 30 %
Stoddard Lock Co.....dis 30 @ 33⅓ %
'Champion" Night Latches.....dis 40 %
Barnes Mfg. Co.....dis 40 %
Eagle and Corbin Trunk.....dis 25&2 %
Champion" Cabinet and Combination....dis 33⅓ %
Yale.....dis 33⅓ %
Romer's.....dis 25 %

Padlocks—
List, Dec. 23, 84.....dis 75 @ 75&10 %
Yale Lock Mfg. Co.'s.....dis 33⅓ %
Eagle.....dis 25&2 %
Eureka, Eagle Lock Co.....dis 40&2 %
Romer's, Nos. 0 to 91.....dis 30 %
Romer's Scandinavian, &c, Nos. 100 to 505...dis 15 %
A. E. Diets.....dis 40 %
"Champion" Padlocks.....dis 40 %
Hotchkiss.....dis 30 %
"Star".....dis 45 %
"Horse Shoe." ₱ doz.. $9.....dis 40 %
Barnes Mfg. Co.....dis 40 %
Nock's.....dis 30 %
Brown's Patent.....dis 25 %
Scandinavian.....dis 90 @ 90&10 %
Tralm's Pat. Scandinavian new list (low)....dis 60 %

Lumber Tools.
Ring Peavies, "Blue Line" Finish.....₱ doz $20.00
Ring Peaves, Common Finish.....₱ doz $18.00
Steel Socket Peavies.....₱ doz $21.00
Mall. Iron Socket Peavies.....₱ doz $19.00
Cant Hooks, "Blue Line" Finish.....₱ doz $16.00
Cant Hooks, Common Finish.....₱ doz $14.00
Cant Hooks, Mall. Socket Clasp, "Blue Line" Finish.....₱ doz $16.00
Cant Hooks, Mall. Socket Clasp Common Finish.....₱ doz $14.50
Cant Hooks, Clip Clasp, "Blue Line" Fin.₱ doz $14.00
Cant Hooks, Clip Clasp, Common Finish..₱ doz $12.00
Sand Spikes.....₱ doz 6 ft., $15.00; 8 ft., $20
Pike Poles, Pike & Hook, 12 ft. 14 ft. 16 ft. 18 ft. 20 ft.
₱ doz.....$11.50 12.50 14.50 17.50 21.50
Pike Poles, Pike only, ₱ doz.....10.00 11.00 13.00 16.00 20.00
Pike Poles, not Ironed, ₱ doz.....6.00 7.00 9.00 12.00 16.0
Setting Poles, ₱ doz.....14.00 15.00 17.00
Swamp Hooks.....₱ doz $18.00

Lustro.
Four-ounce Bottles.....₱ dos. $1.75 ₱ gro. $17. 00

Mallets.
Hickory.....dis 20&10@20&10&10 %
Agnumvitae.....dis 20&10@20&10&10 %
B. & L. Block Co., Hickory and L. V...dis 30 @ 30&10 %

Match Safes.
Dangerfield's Self-Igniting.....₱ doz $12

Mattocks.—Regular list....dis 60&10 @ 60&10&5 %

Meat Cutters

Dixon's—Nos.	1	2	3	4	
₱ dos.	$14.00	17.00	19.00	30.00	—dis 40&5 %
Woodruff's Nos.	100	150			
₱ doz.	$15.00	18.00			—dis 40& %
Champion Nos.	200	300	400		
₱ dos.	$24.00	27.00	40.00		—dis 40& %
Hales' Pattern Nos.	11	12	13		
₱ dos.	$27.00	33.00	45.00		dis 70 & 70&5 %

American.....dis

Nos.	1	2	3	4B		
Each	$5.00	7.00	10.00	25.00	50.00	60.00

Enterprise.....dis 5 %

Nos.	10	12	22	32	42
Each	$3.	2.50	4.00	6 00	15.00

Pennsylvania.....dis 40&10%
Nos..... 1 2 3 00
₱ doz.....$24.00 28.00 36 00 48 00
Miles' Challenge..Nos. 1 2
₱ doz..$22.00 30.00 40.00—dis 45@45&10 %
Home No. 1.....$26 ₱ doz, dis 55&10 %
Draw Cut..Nos.. 5 2 6 8
Each....$50.00 75.00 80.00 225.00—dis 20 @ 25 %
Beef Shavers (Enterprise Mfg. Co.)....dis 20&10 @ 30 %
Chadborn's Smoked Beef Cutter.....₱ doz, $66.00

Mincing Knives.
Am. (2d quality), ₱ gro, 1 blade, $7; 2 blades, $12; 3 blades, $15.....net
Lothrop's.....dis 20&10 %
Smith's, ₱ doz, Single, $2.00; Double, $3....dis 40@45 %
Knapp & Cowles.....dis 50&10@60 %
Buffalo Adjustable.....₱ doz $3.00, dis 25 %

Molasses Gates.—Stebbins' Pat..dis 70@70 & 7½ %
Stebbins' Genuine.....dis 60&10&10 %
Stebbins' Tinned Ends.....dis 40&10 %
Chase's Hard Metal.....dis 50&10 %
Bush's.....dis 20 %
Lincoln's Pattern.....dis 70 @ 70&10 %
Weed's.....dis 20&10 %
Boss Nos.. 1 2 3 4
$7.00 8.00 9.00 10.00. ₱ doz, dis 60&10&10 %

Money Drawers.—₱ doz., $18 @ $20.

Muzzles.—Safety, ₱ doz. $3.....dis 25 %

Nails.....See Trade Report
Wire Nails & Brads, list July 14, '87..dis 70&10 %
Wire Nails, Standard Penny.....₱ keg, $2.60 @ $2.70

Nail Puller.—Curtiss Hammer...₱ doz $9.00 net
Giant, No. 1.....₱ doz $30.00, dis10 %
Pelican.....₱ doz $9.00. dis 25 %
Boss.....₱ doz $30, dis 30 %

Nail Sets.—Square.....₱ gro., $4.00 @ $4.25
Round.....₱ gro., $3.25
Cannon's Diamond Point.....₱ gro. $12 dis 20 %

Nut Crackers.
Table (Humason & Beckley Mfg. Co.).....dis 40 %
Blake's pattern.....₱ doz $2.00. dis 10 %
Turner & Seymour Mfg. Co.....dis 50 %

Nuts.
Nuts, all kinds, 5½¢ off list Jan. 1, 1888.
In lots less than 100 ℔, ₱ ℔, add ½¢, 1 ℔ boxes add 1¢ to list.

Oakum.
Government.....₱ ℔ 8¢
U. S. Navy.....₱ ℔ 7¢
Navy.....₱ ℔ 6¢ @ 6½¢

Oilers.—Zinc and Tin.....dis 65 @ 65&10 %
Brass and Copper.....dis 50&10@50&10&5 %
Malleable, Hammers' Improved, No 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₱ doz.....dis 10 @ 10&10 %
Malleable, Hammers, Old Pattern, same list....dis 40 %
Prior's Patent or "Paragon" Zinc.....dis 60&10&10 %
Prior's Patent or "Paragon" Brass.....dis 50 %
Olmstead's Tin and Zinc.....dis 60 %
Olmstead's Brass and Copper.....dis 50 %
Broughton's Zinc.....dis 60 %
Broughton's Brass.....dis 50 %

Packing, Steam.
Rubber—
Standard.....dis 60&10 @ 60&10&10 %
Extra.....dis 50&10 @ 60 %
N. Y. B. & P.Co., Standard.....dis 50&10&5 %
N. Y. B. & P. Co., Empire.....dis 70 %
N. Y. B. & P. Co., Salamander.....₱ ℔ 65¢, dis 30 %
Jenkins' Standard.....₱ ℔ 80¢, dis 35 %
Miscellaneous—
American Packing.....10¢ @ 11¢ ₱ ℔
Russia Packing.....14¢ ₱ ℔
Italian Packing.....13 @ 14¢ ₱ ℔
Cotton Packing.....15 @ 17¢ ₱ ℔
Jute.....7 @ 8¢ ₱ ℔

Padlocks.—See Locks.

Pails.
Galvanized Iron—

Quarts	10	12	14
Hill's Light Weight, ₱ doz	$2.75	3.00	3.25
Hill's Heavy Weight, ₱ doz	3.00	3.25	3.75
Whiting's	2.75	3.00	3.25
Sidney Shepard & Co	2.80	.....	3.40
Iron Clad	2.75	3.00	3.25
Fire Buckets	2.75	3.25	3.50

Buckets, see Well Buckets
Indurated Fibre Ware—
Star Pails, 12 qt.....₱ doz $4.50
Fire Stable and Milk, 14 qt.....₱ doz $5.50

Pencils. Faber's Carpenters'.....high list, dis 50 %
Faber's Round Gilt.....₱ gro $5.25 net
Dixon's Lead.....₱ gro $4.50 net
Dixon's Lumber.....₱ gro $6.75 net
Dixon's Carpenters'.....dis 40&10 %

Picks.
Railroad, 5 to 6, $12.00; 6 to 7, $13, dis 60&10@60&10 &5 %
Adze Eye, 5 to 6, $12.00; 6 to 7, $13, dis 60&10@60&10&5 %

Picture Nails.
Brass Head, Sargent's list.....dis 50&10&10 %
Brass Head, Combination list.....dis 50&10 %
Porcelain Head, Sargent's list.....dis 50&10&10 %
Porcelain Head, Combination list.....dis 40&10 %
Niles' Patent.....dis 40 %

Pinking Irons......₱ dos 65¢ net

Pipe, Wrought Iron.—List March 23, 1887.
1¼ and under. Plain.....dis 55 %
1¼ and under. Galvanized.....dis 47½ %
1¼ and over. Plain.....dis 65 %
1¼ and over. Galvanized.....dis 55 %
Boiler Tubes, Iron.....dis 65 %

Planes and Plane Irons.
Wood Planes—
Molding.....dis 5(&5 @ 50&10 %
Bench, First Quality.....dis 50&10 @ 60 %
Bench, Second Quality.....dis 60&10 @ 60&10&5 %
Bailey's (Stanley R. & L. Co.).....dis 30&10 %
Iron Planes—
Bailey's (Stanley R. & L. Co.)...dis 30&10@30&10&5 %
Miscellaneous Planes (Stanley R. & L. Co.)..dis 20&10 %
Victor Planes (Stanley R. & L. Co.)....dis 20& 10 %
Steer's Iron Planes.....dis 35 @ 35&5 %
Meriden Mal. Iron Co.'s.....dis 30&10@30&10&10 %
Davis's Iron Planes.....dis 30&10@30&10&10 %
Birmingham Plane Co.....dis 50@50&5 %
Gage Tool Co.'s Self-Setting.....dis 20 %
Chaplin's Iron Planes.....dis 40 @ 40&5 %
Sargent's.....dis 30&10 @ 30&.0&10 %
Plane Irons—
Plane Irons.....dis 20&10 %
Plane Irons, Butcher's.....$5.00 @ $5.25 to £
Plane Irons, Buck Bros.....dis 30 %
Plane Irons, Auburn Tool Co.'s "Thistle".....dis 40 %
Plane Irons, Middlesex Mfg. Co., "Baldwin Iron," Single and Cut.....dis 20 @ 25 %
Double.....dis 33⅓ @ 40 %
L. & L. J. White.....dis 25 %

Pliers and Nippers.
Button's Patent.....dis 30&10 @ 40 %
Hall's Pat. Compound Lever Cutting Nippers, No. 2, 5 in., $13.50; No. 4, 7 in., $21.00 ₱ dos dis 20&10@33⅓ %
Humason & Beckley Mfg. Co.....dis 50@50&10 %
Gas Pliers.....dis 40 %
Gas Pliers, Custer's Nickel Plated.....dis 60&5 %
Eureka Pliers and Nippers.....dis 40 %
Russell's Parallel.....dis 25 %
P. S. & W. Cast Steel.....dis 50 %
P. S. & W. Tinners' Cutting Nippers....add 6 %
Carew's Pat. Wire Cutters.....dis 20 %
Morrill's Parallel, per doz., $12.....dis 30&5 %
Cronk's 8 in., $15; 10 in., $21.....dis 10 @ 40&5 %

Plumbs and Levels.
Regular List.....dis 70&10@70&10&10 %
Disston's.....dis 45&10 %
Pocket Levels.....dis 70&10@70&10&10 %
Davis Iron Levels.....dis 30 %
Davis' Inclinometers.....dis 10&10 %

Poppers, Corn.
Round or Square, 1 qt.....₱ gro $12 @ $15
Round or Square, 2 qt.....₱ gro $25 @ $26

Post Hole and Tree Augers and Diggers.
Samson Post Hole Digger.....₱ doz $36.00, dis 25&10 %
Fletcher Post Hole Augers.....₱ doz $36.00. dis 20 %
Eureka Diggers.....₱ doz $16 @ $17
Leed's.....₱ doz $8.00 @ $9.00
Vaughan's Post Hole, Auger, per doz....$13 00 @ $14.00
Kohler's Little Giant.....₱ doz $18.00
Kohler's Hercules.....₱ doz $15.00
Kohler's New Champion.....₱ doz $9.00
Schneidler.....₱ doz $18
Ryan's Post Hole Diggers.....₱ doz $24
Cronk's Post Bars.....₱ doz $60, dis 50&5 @ 50&10 %
Gibb's Post Hole Digger, ₱ doz $30....dis 40 @ 40&10 %

Potato Parers.
White Mountain.....₱ doz $5.00 @ 5.50
Antrim Combination.....₱ doz $8.00
Hoosier.....₱ doz $13.50

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw, ₱ doz $18.00.....dis 20&10 %
Disston's Pruning Hook.....₱ doz $12.00, dis 20&10 %
E. S. Lee & Co.'s Pruning Tools.....dis 40 %
Pruning Shears, Henry's Pat...₱ doz $3.75 @ $4.00 net
Henry's Pruning Shears.....₱ doz $4.25 @ $4.50 net
Wheeler, M. & Co.'s Combination...₱ doz $12, dis 20 %
Dunlap's Saw and Chisel.....₱ doz $8.50, dis 30 %
J. Mallinson & Co.....No. 1, $5.25; No. 2, $7.25

Pulleys.—Hot House, Awning, &c.....dis 60&10 %
Japanned Screw.....dis 60&10 %
Brass Screw.....dis 60&10 %
Japanned Side.....dis 60&&10 %
Japanned Clothes Line.....dis 60&10 %
Empire Sash Pulley.....dis 55 @ 60 %
Moore's Sash, Anti Friction.....dis 50 %

Hay Fork, Solid Eye, $4.00; Swivel, $4.50 } dis 50&10 @ 50&10&5 %
Hay Fork, "Anti-Friction," 5 in. Solid, $5.70.....dis 50 %
Hay Fork, "P" Common and Pat. Bushed.....dis 40 %
Hay Fork, Tarbox Pat. Iron.....dis 20 %
Hay Fork, Reed's Self-Lubricating.....dis 60 %
Shade Rack.....dis 45 %
Tackle Blocks.....See Blocks

Pumps.—Cistern, Best Makers.....dis 50 @ 10&60 %
Pitcher Spout, Best Makers...dis 60&10 @ 60&10&10 %
Pitcher Spout, Cheaper Goods..dis 70&5 @ 70&10&5 %

Punches.
Saddlers' or Drive, good quality.....₱ doz 60¢ @ 65¢
Bemis & Call Co.'s Cast Steel Drive.....dis 50&5 %
Bemis & Call Co.'s Springfield Socket.....dis 50&5 %
Spring, good quality.....₱ doz $2.50 @ $2.60
Spring, Leach's Patent.....dis 15 %
Bemis & Call Co.'s Spring and Check.....dis 40 %
Solid Tinners'.....₱ doz $1.44, dis 55 %
Tinners' Hollow Punches.....dis 20&2 %
Rice Hand Punches.....dis 15 %

Rail.
Sliding Door, Wrt. Brass ₱ ℔ 35¢.....dis 15 %
Sliding Door, Bronzed Wrt. Iron.....₱ foot 7¢
Sliding Door Iron, Painted....₱ foot 4¢, dis 20&10&5 %
Barn Door, Light....Inch. ¾ ⅝ ½
Per 100 feet..... $2.50 3.00 4.40—dis 10 %
B ℔ for N E. Hangers—

	Small.	Med.	Large
Per 100 feet	$2.15	2.70	3.25 net

Terry's Wrought Iron, ₱ foot.....4½¢ @ 5¢
Victor Track Rail, 7¢ ₱ foot.....dis 50&2 %
Carrier Steel Rail, per foot.....4½¢

Rakes.
Cast Steel, Association goods.....dis 65&5 %
Cast Steel, outside goods.....dis 60&10 @ 70 %
Malleable.....dis 70 @ 70&5 %
Gibbs Lawn Rake.....$12, dis 40 %
Canton Lawn Rake.....$9, dis 40 %
Ft. Madison Prize Bow Brace and Peerless..dis 65&5 %
Fort Madison Steel Tooth Lawn Rake, $6.....dis 25 %

Razors.—J. R. Torrey Razor Co.....dis 20%
Wostenholme and Butcher.....$10 to £, dis 10 %

Razor Strops.
Genuine Emerson.....dis 60 @ 60&5 %
Imitation Emerson.....₱ doz $2.00, dis 20&10&5 %
Torrey's.....dis 20 %
Badger's Belt and Combination.....₱ doz $2
Lamont Combination.....₱ doz $4

Rivets and Burrs.
Copper.....dis 50 @ 50&10 %
Iron, list November 17, 1887.....dis 50 @ 50&7½ %

Rivet Sets......dis 50&2 @ 50&10 %

Rods.—Stair, Brass.....dis 2b&2 %
Stair, Black Walnut.....₱ doz 40¢

Rollers.
Barn Door, Sargent's list.....dis 60&10&10 %
Acme (Anti-Friction).....dis 55 %
Union Barn Door Roller.....dis 70 %

Rope.—Manufacturers' prices for large lots.
Manila.....⅝ inch and larger ₱ ℔ 11¼¢ net
Manila.....¾ inch ₱ ℔ 11¼¢ net
Manila.....⅞ and 5-16 inch ₱ ℔ 12¼¢ net
Manila Tarred Rope.....₱ ℔ 10¾¢ net
Manila, Hay Rope.....₱ ℔ 11¼¢ net
Sisal.....½ inch and larger ₱ ℔ 9¼¢ net
Sisal.....⅝ inch ₱ ℔ 9¾¢ net
Sisal.....¾ and 5-16 inch ₱ ℔ 10¼¢ net
Sisal, Hay Rope.....₱ ℔ 9¼¢ net
Sisal, Tarred Rope.....₱ ℔ 8¾¢ net
Sisal, Medium Lath Yarn.....₱ ℔ 8¼¢ net
Cotton Rope.....₱ ℔ 15 @ 18¢ net
Jute Rope.....₱ ℔ 7¢
Discount 1¼ % for cash in 10 days.

Rules.
Boxwood.....dis 80&10 @ 80&10&10 %
Ivory.....dis 50 @ 50&10 %
Starrett's Rules and Straight Edges, Steel..dis 25&10 %

Sad Irons.
From 4 to 10, at factory.....₱ 100 ℔ $2.40 @ $2.55
Self-Heating.....₱ doz. $9.00 net
Self-Heating, Tailors'.....₱ doz. $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Mrs. Pott's Irons.....dis 40@40&5 %
Enterprise Star irons, new list, July 20, 1882....dis 40 %
Combined Fluter and Sad Iron...₱ doz. $15.00, dis 15 %
Fox Reversible, Self Fluter.....₱ doz., $24.00 net
Chinese Laundry (N. E. Butt Co.).....8½¢, dis 15 %
New England.....8¢, dis 15 %
Mahony's Troy Pol. Irons.....dis 25&%
Sensible.....dis 20 @ 20&5 %

Sand and Emery Paper and Cloth.
List April 19, 1886.....dis 20@20&5 %
Sibley's Emery and Crocus Cloth.....dis 30 %

Sash Cord.
Common.....₱ ℔, 10¢ @ 11¢
Patent, good quality.....₱ ℔, 13¢ @ 13½¢
White Cotton Braided, fair quality.....₱ ℔ 25¢ @ 25¢
Common Russia Sash.....₱ ℔ 13½¢
Patent " " .....₱ ℔ 15¢
Cable Laid Italian " .....₱ ℔ 22¢ @ 23¢
India Cable Laid " .....₱ ℔ 13¢
Silver Lake, A Quality, White.....50&5, dis 10&10&5 %
Silver Lake, A Quality, Drab.....55¢, dis 10&10&5 %
Silver Lake, B Quality, White.....50¢, dis 20&10&5 %
Silver Lake, B Quality Drab.....55¢, dis 20&10&5 %
Silver Lake, C Quality, White (only).....27¢ @ 28¢
Sylvan Spring, Extra Braided, White.....34¢
Sylvan Spring, Extra Braided, Drab.....30¢
Semper Idem, Braided, White.....30¢
Egyptian, India Hemp, Braided.....25¢
Samson, Braided, White Cotton...50¢ dis 30 @ 30&5 %
Samson, Braided, Drab Cotton.....55¢ dis 30 @ 30&5 %
Samson, Braided Italian Hemp....55¢ dis 30 @ 30&5 %
Samson Braided Linen.....80¢ dis 30 @ 30&5

Sash Locks.
Clark's No. 1, $10.00; No. 2, $8.00 ₱ gross.....dis 33⅓ %
Ferguson's.....dis 33⅓ %
Morris and Triumph, list Aug. 16, 1886.....dis 60&2 %
Victor.....60&10&2 %
Walker.....dis 10 %
Attwell Mfg. Co.....dis 25 @ 33⅓ %
Reading.....dis 66⅔&10 @ 66⅔&10&10 %
Hammond's Window Springs.....dis 40 %
Common Sense, Jap'd, Cop'd and Br'zed..₱ gross $4.50
Common Sense, Nickel Plated.....₱ gross $18.00
Universal.....dis 30 %
Kempshall's Gravity.....dis 60 %
Kempshall's Model.....dis 60@60&10 %
Corbin's Daisy, list February 15, 1886.....dis 70 %
Payson's Perfect.....dis 60 @ 60&10 %
Hugunin's New and Improved Adjustable Sash Balances, list Jan. 5, 1887.....dis 25&5&2 %
Hugunin's New Sash Locks, list Jan. 5, '87. dis 25&5&2 %
Stoddard "Practical".....dis 10 %
Ives Patent.....dis 60 %
Lische's Nos. 100 & 110, ₱ gro. $8; 105, $10. dis 20&10 %
Davis, Bronze, Barnes Mfg. Co.....dis 50 %
Champion Safety, List March 1, 1888.....dis 55@55&5 %
Security.....dis 70 %

Sash Weights.
Solid Eyes.....₱ ton. $22

Sausage Stuffers or Fillers.
Miles' "Challenge".....₱ dos. $20, dis 50@50&5 %
Perry.....₱ dos. No. 1, $15; No. 0, $21, dis 50@50&5 %
Draw Cut No. 4.....each, $30.00, dis 20 %
Enterprise Mfg. Co.....dis 20&10 @ 30 %
Oliver's.....dis 40&10 %

Saws.
Disston's Circular....dis 45@45&5 %) Extras some
Disston's Cross Cuts..dis 45@45&5 %) times given by
Disston's Hand.....dis 25@25&5 %) jobbers.
Atkins' Circular.....dis 50 %
Atkins' Silver Steel Diamond X Cuts.....₱ foot 70¢
Atkins' Special Steel Dexter X Cuts.....₱ foot 50¢
Atkins' Special Steel Diamond X Cuts.....₱ foot 30¢
Atkins' Champion and Electric Tooth X Cuts.....₱ foot 27 @ 28¢
Atkins' Hollow Back X Cuts.....₱ foot 18¢
Atkins' Shingle, Mulay, Drag, &c.....dis 45 %
W. M. & C., Hand.....dis 30&5 @ 30&10 %
W. M. & C. Champion X Cuts. Regular ₱ foot .24¢@26¢
W. M. & C. X Cuts. Thin Back.....₱ foot 27¢@29¢
Peace Circular and Mill.....dis 45&10 %
Peace Hand Panel and Rip....dis 20&10 @ 20&10&10 %
Peace Cross Cuts, Standard.....₱ foot 25¢
Peace Cross Cuts, Thin Back.....₱ foot 27¢@28¢
Richardson's Circular and Mill.....dis 45 @ 45&10 %
Richardson's X-Cuts, No. 1, 39¢; No. 2, 27¢; No. 3, 24¢
Hack Saws—
Griffin's Hack Saws, complete.....dis 40&10 @ 50 %
Griffin's Hack Saw, Blades only.....dis 40&10 @ 50 %
Star Hack Saws and Blades.....dis 25 %
Diamond Hack Saws and Blades.....dis 25 %
Eureka and Crescent.....dis 25 %

Saw Frames.
White Vermont.....₱ gro $9 @ $10
Red, Polished, and Varnished....₱ dos $1.50, dis 25 %

Saw Sets.
Stillman's Genuine....₱ dos $5.00 and $7.75, dis 40&5 %
Stillman's Imita..₱ dos $3.25 and $5.25, dis 40&50&10&10 %
Common Lever.....₱ dos $3.00, dis 40&5 %
Morrill's No. 1, $15.00; Nos. 3 & 4, $24....dis 40&10@50 %
Leach's.....No. 0, $8.00; No. 1, $15.00, dis 15 @ 20 %
Nash's.....dis 20&10 @ 20&10&10 %
Hammer, Hotchkiss.....$5.50, dis 10 %
Hammer, Bemis & Call Co.'s new Patent....dis 30&5 %
Bemis & Call Co.'s Lever and Spring Hammer..dis 30&5 %
Bemis & Call Co.'s Plate.....dis 10 %
Bemis & Call Co.'s Cross Cut.....dis 10&5 %
Aiken's Genuine.....$15.00, dis 50&10 %
Aiken's Imitation.....$7.00, dis 50&5 %
Hart's Patent Lever.....dis 20 %
Disston's, Star, 79. No. 15, $5.50, dis 20&10@20&10&10 %
Atkins' Lever.....per dos No. 1, $6.00; No. 2, $9.60
Atkins' Criterion.....per dos $7.50
Croissant (Keller), No. 1, $15.00; No. 2, $24.00....dis 40&10 %

Saw Tools.
Atkins Perfection.... $15.00; Excelsior $6.00 ₱ dos

Scales.
Hatch, Counter, No. 171, good quality.....₱ dos $21
Hatch, Tea, No. 161.....₱ dos $6.75 @ $7.00
Union Platform, Plain.....$2.10 @ 2.20
Union Platform, Striped.....$2.20 @ 2.30
Chatillon's Grocers' Trip Scales.....dis 25 %
Chatillon's Eureka.....dis 25 %
Chatillon's Favorite.....dis 40 %
Family, Turnbull's.....dis 30@30&10

Scale Beams.
Scale Beams List of Jan. 12, 82..dis 50&10@50&10&5 %
Chatillon's No. 1.....dis 40 %
Chatillon's No. 2.....dis 50 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.)..$6.50, dis 30&10 %
Box, 1 Handle.....₱ dos $4.00, dis 10 %
Box, 2 Handle.....₱ dos $6.00, dis 10 %
Defiance Box and Ship.....dis 20&10 %
Hook.....dis 50&10@50 %
Ship, Common.....₱ dos $3.50 net
Ship, Providence Tool Co.....dis 10 %

Screen Window and Door Frames.
Porter's Pat. Window and Door Frame...dis 33⅓&10 %
Screen Corner Irons, Warner's....dis 33⅓ @ 33⅓&10 %
Stearns' Frames and Corners.....dis 25 @ 25&10 %

Screw Drivers.
Douglas Mfg Co.....dis 20&10&10 %
Disston's.....dis 45&10 %
Disston's Patent Excelsior.....dis 45&10 %
Buck Bros.....dis 30 %
Stanley R. & L. Co.'s Varnished Handles....dis 65&10 %
Stanley R. & L. Co.'s Black Handles.....dis 60&10 %
Sargent & Co.'s No. 1 Forged Blade....dis 60&10&10 %
Sargent & Co.'s Nos. 20, 10 and 60.....dis 66⅔&10&10 %
Knapp & Cowles' No. 1.....dis 60&20 @ 70 %
Knapp & Cowles' No. 1 Extra.....dis 60 @ 60&10 %
Knapp & Cowles No. 00 & 4.....dis 50&5 @ 50&10&5 %
Stearns'.....dis 25&10&5 %
Gay & Parsons.....dis 35 %
Champion.....dis 25&10 %
Clark's Patent.....dis 30 @ 33⅓ %
Crawford's Adjustable.....dis 50 %
Ellrich's Socket and Ratchet.....dis 25 &10 %
Allard's Spiral, new list.....dis 25 %
Kolb's Common Sense.....₱ dos $6, dis 25&10

Syracuse Screw-Driver Bits.....dis 30 & 30&5 %
Screw Driver Bits.....₩ doz. 50¢ @ 75¢
Screw Driver Bits. Parr's.....₩ gro 6.25
Fray's Hol. Hdle. Sets, No. 3, $12.....dis. 25 @ 25 & 10 %
P. D. & Co.'s, all Steel.....dis 50 %

Screws

Wood Screws—List, Brass, Jan 27; Iron, July 1, 1887

Flat Head Iron.....dis 70 %
Round Head Iron.....dis 65 %
Flat Head Brass.....dis 65 %
Round Head Brass.....dis 60 %
Flat Head Bronze.....dis 65 %
Round Head Bronze.....dis 60 %

} Ex. 10 % often given by jobbers.

Machine—
Flat Head, Iron.....dis 55 %
Round Head, Iron.....dis 50 %

Bench and Hand—
Bench, Iron.....dis 55&10 @ 55&10&10 %
Bench, Wood, Beech.....₩ doz $2.25
Bench, Wood, Hickory.....dis 20&10 %
Hand, Wood.....dis 25&10 @ 25&10&5 %
Lag, Blunt Point.....dis 75 @ 75&10 %
Coach and Lag, Gimlet Point.....dis 75 %
Bed.....dis 25&5 %
Hand Rail, Sargent's.....dis 66⅔&10 %
Hand Rail, Humason, Beckley & Co.'s..dis 70&10@75 %
Hand Rail, Am. Screw Co.....dis 75 %
Jack Screws, Millers Falls list.....dis 50 @ 50&5 %
Jack Screws, P. S. & W.....dis 35 %
Jack Screws, Sargent.....dis 60&10 @ 60&10&5 %
Jack Screws, Stearns.....dis 40 @ 40&10 %

Scroll Saws.
Lester, complete, $10.00.....dis 25 %
Rogers, complete, $4.00.....dis 25 %
Barnes' Builders' and Cabinet Makers', $15....dis 25 %

Scythe Snaths.....dis 50&2 %

Shears.
American (Cast) Iron.....dis 75&10 @ 75&10&5 %
Pruning.....See Pruning Hooks and Shears
Barnard's Lamp Trimmers.....₩ doz $3.75
Tinners'.....dis 20&2 %
Seymour's, List, Dec., 1881 dis 60&10&10@60&10&10&5 %
Heinsch's, List, Dec., 1881, dis 60&10&10@60&10&10&5 %
Heinsch's Tailor's Shears.....dis 33⅓ %
First quality C. S. Trimmers.....dis 80@80&10 %
Second quality C. S. Trimmers.dis 80&10@80&10&10 %
Acme Cast Shears.....dis 10&10 %
Diamond Cast Shears.....dis 10 %
Clipper.....dis 10&10 %
Victor Cast Shears.....dis 75&10@75&10&5 %
Howe Bros. & Hulbert, Solid Forged Steel....dis 40 %
Cleveland Machine Co., Solid Steel Forged.....dis 70 %
Clauss Shear Co., Japanned.....dis 70 %
Clauss Shear Co., Nickeled, same list.....dis 60 %

Sheaves

Sliding Door—
M. W. & Co., list July, 1888.....dis 50&10 @ 60&5 %
R. & E., list Dec. 18, 1885.....dis 55&2 %
Corbin's list.....dis 60&10&2 %
Patent Roller.....dis 60&10&2 %
Patent Roller, Hatfield's.....dis 75 %
Russell's Anti-Friction, list Dec. 18, 1885..dis 60&2 %
Moore's Anti-Friction.....dis 60 %

Sliding Shutter—
R. & E. list Dec. 18, 1885.....dis 60&10&2 %
Sargent's list.....dis 60&10 %
Reading list.....dis 60&10&10 %

Ship Tools.
L. & I. J. White.....dis 20&5 %
Albertson Mfg. Co.....dis 25 %

Shoes, Horse, Mule, &c.

Horse—
Burden's, Perkins', Phoenix, at factory.....$4.00

Mule—Add $1 ₩ keg to above prices.

Ox, Wrought—
Ton lots.....₩ ₤ 9¢
1000 ₤ lots.....₩ ₤ 9½¢
500 ₤ lots.....₩ ₤ 10¢

Shot.—(*Eastern prices, 2¢ off. cash, 5 days.*)
Drop, ₩ bag, 25 ₤.....$1.50
Drop, ₩ bag, 50 ₤......38
Buck and Chilled, ₩ 25-₤ bag.....$1.75
Buck and Chilled, ₩ 5 ₤ bag.....40

Shovels and Spades.
Ames' Shovels, Spades, &c., list Nov. 1, 1885....dis 20 %
NOTE.—Jobbers frequently give 5 @ 7½ % extra on above.
Griffith's Black Iron.....dis 50&10 %
Griffith's C. S.....dis 60 @ 60&10 %
Griffith's Solid Cast Steel R. R. Goods.....dis 20 %
Old Colony (Sanford Fork & Tool Co).....dis 20 %
St. Louis Shovel Co.....dis 20 @ 20&7½ %
Hussey, Bluns & Co.....dis 15 @ 25 %
Hubbard & Co.....dis 20@20&7½ %
Lehigh Mfg. Co.....dis 50&10 %
Payne Pettebone & Son, list January, 1886....dis 30 %
Remington's (Lowman's Patent).....dis 30&10 @ 40 %
Rowland's, Black Iron.....dis 50&10 %
Rowland's Steel.....dis 60&5 @ 60&10 %

Shovels and Tongs.
Iron Head.....dis 60&10@60&10&5 %
Brass Head.....dis 60&10&10 %

Skeins, Thimble.
Western list.....dis 75&5 @ 75&10 %
Columbus Wrt. Steel, list Nov. 1, 1887.....dis 20 %
Coldbrookdale Iron Co.....dis 50&10 %
Utica P. S. T. Skeins.....dl- 60 %
Utica Turned and Fitted.....dis 35 %

Sieves.
Buffalo Metallic, S. S. & Co., new list..dis 50&25&10 %
Barler Flour Sifters.....₩ doz $2.00
Smith's Adjustable Sifters.....₩ doz $2.25
Smith's Adjustable Milk Strainer.....₩ doz $2.00
Smith's Adjustable F. & C. Strainer.....₩ doz $1.75

Sieves, Wooden Rim—	Iron.	Plated.
Mesh 18, Nested, ₩ doz.	70¢	90¢
Mesh 20, Nested, ₩ doz.	85¢	$1.00
Mesh 24, Nested, ₩ doz.	$1.00	1.10

Slates.—School, by case.....dis 50&10 %

Snaps, Harness, &c.
Anchor (T. & S. Mfg Co.).....dis 66 %
Fitch's (Bristol).....dis 50&10 %
Hotchkiss.....dis 10 %
Andrews.....dis 50 %
Sargent's Patent Guarded.....dis 70&10&10 %
German, new list.....dis 40&10 %
Covert.....dis 50&2 %
Covert, New Patent.....dis 50&5&2 %
Covert New R. E.....dis 60&2 %
Covered Spring.....dis 60&10&10 %

Soldering Irons.
Covert's Adjustable, list Jan. 1, 1886.....dis 35&2 %

Spoke Shaves.—Iron.....dis 45 %
Wood.....dis 30 %
Bailey's (Stanley R. & L. Co.).....dis 40&10 %
Stearns'.....dis 20&10 @ 30 %

Spoke Trimmers.
Bonney's.....₩ doz $10.00, dis 50 %
Stearns'.....dis 20&10 %
Ives'.....No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 55&10 %
Douglass'.....₩ doz $9.00, dis 20 %

Spoons and Forks.

Tinned Iron—
Basting, Central Stamping Co.'s list.....dis 70&10 %
Solid Table and Tea, Central Stamping Company's list.....dis 70&10 %
Buffalo, S. S. & Co.....dis 33⅓&2 %

Silver-Plated—4 mos. or 5 % cash 30 days.
Meriden Brit. Co., Rogers.....dis 50 %
C. Rogers & Bros.....dis 50 %
Rogers & Bro.....50 %
Reed & Barton.....dis 50 %
Wm. Rogers Mfg. Co.....dis 50&10 @ 50&10&5 %
Simpson, Hall, Miller & Co.....dis 50&10 %
Holmes & Edwards Silver Co..dis 50&10 @ 50&10&5 %
H. & E. Silver Co. Mexican Silver.....dis 50&5 %
H. & E. Silver Co., Durham Silver.....dis 50&5 %
German Silver.....dis 50 @ 50&5 %
German Silver, Hall & Elton.....dis 50&5 %, cash
Nickel Silver.....dis 50&5@50&10&5 %, cash
Britannia.....dis 60 %
Boardman's Flat Ware.....dis 50&10 %
Boardman's Nickel Silver.....dis 50 %
Boardman's Brit'nia Spoons, case lots..dis 60 %

} Extra 10@10&5 % generally given.

Springs.
Elliptic, Concord, Platform and Half Scroll...
Cliff's Bolster Springs.....dis 20 %

Squares.
Steel and Iron.....dis 75 @ 80 %
Nickel-Plated.....
Try Square and T Bevels.....dis 60&10&10 @ 70 %
Disston's Try Square and T Bevels.....dis 45&10 %
Winterbottom's Try and Miter.....dis 30&10 %
Starrett's Micrometer Caliper Squares.....dis 25 %

Staples.
Fence Staples, Galvanized } Same price as Barb Wire.
Fence Staples, Plain } See Trade Report.

Steelyards.....dis 40&10&10&5 %

Stocks and Dies.
Blacksmith's, Waterford Goods...dis 30&5 @ 30&10 %
Lightning Screw Plate.....dis 25 @ 30 %
Reece's New Screw Plates.....dis 33⅓ @ 33⅓&5 %

Stone.
Hindostan No. 1, 3¢; Axe, 3½¢; Slips No. 1, 5¢.
Sand Stone.....₩ ₤, 2¢
Washita Stone, Extra.....₩ ₤, 2 1 @ 22¢
Washita Stone, No. 1.....₩ ₤, 15 @ 16¢
Washita Stone, No. 2.....₩ ₤, 11 @ 12¢
Washita Slips, No. 1. Extra.....₩ ₤, 40 @ 42¢
Washita Slips, No. 1.....₩ ₤, 30 @ 32¢
Arkansas Stone, No. 1, 4 to 6 in.....₩ ₤, $1.35
Arkansas Stone, No. 1, 6 to 9 in.....₩ ₤, $1.75
Turkey Oil Stone.....4 to 8 in., ₩ ₤, 40¢
Turkey Slips.....₩ ₤, $1.00 @ $1.50
Lake Superior, Chase.....₩ ₤, 16¢
Lake Superior Slips, Chase.....₩ ₤, 31@32¢
Seneca Stone, Red Paper Brand, ₩ ₤.....18 @ 20¢
Seneca Stone, High Rounds, ₩ ₤.....20 @ 25¢
Seneca Stone, Small Whets, ₩ gro.....$24.00

Stove Polish.—Joseph Dixon's..₩ gro $6. dis 10 %
Gem.....₩ gro $4.50, dis 10 %
Gold Medal.....₩ gro $6.00, dis 25 %
"Mirror".....₩ gro $6.00, dis — %
Lustro.....₩ gro $4.75 net
Ruby.....₩ gro $3.75 net
Rising Sun, ½ gro. lots.....₩ gro $5.50
Dixon's Plumbago.....₩ ₤ 8¢ net
Boynton's Noon Day, ₩ gro.....$5.00
Parlor Pride Stove Enamel.....₩ gross, $13
Yates' Liquid, 2 3 5 10 gal. cans
₩ gal.. $0.90 .80 .70 .60
Yates Standard Paste Polish, 10-lb cans, per lb., 15 ¢
Jet Black.....₩ gro $3.50
Japanese.....₩ gro $3.50
Fireside.....₩ gro $2.50
Diamond O. K. Enamel.....₩ gro $19.00
Bonnell's Liquid Stove Polish.....₩ gro $4.00
Bonnell's Paste Stove Polish.....₩ gro $4.00

Tacks, Brads, &c.
List, Jan. 2, 1888.

American Iron Carper Tacks.....dis 72½&10&2 %
Steel Carpet Tacks.....dis 72½&10&2 %
Swedes Iron Carpet Tacks.....dis 72½&10&2 %
American Iron Cut Tacks.....dis 70&10&2 %
Swedes Iron Tacks.....dis 67½&10&2 %
Swedes Iron Upholsterers' Tacks...dis 67½&10&2 %
Tinned Swedes Iron Tacks.....dis 67½&10&2 %
Tin'd Sw'des Iron Uphol'ers' Tacks.dis 67½&10&2 %
Gimp and Lace Tacks.....dis 67½&10&2 %
Tinned Gimp and Lace Tacks.....dis 67½&10&2 %
Swedes Iron Trimmers' Tacks....dis 67½&10&2 %
Swedes Iron Miners' Tacks.....dis 67½&10&2 %
Swedes Iron Bill Posters' or Railroad Tacks.....dis 67½&10&2 %
Swedes Steel Tacks, all kinds (Swedes Iron price list).....dis 72½&10&2 %
Copper Tacks.....dis 33½&10&2 %
Copper Finishing Trunk and Clout Nails.....dis 33½&10&2 %
Finishing Nails.....dis 60&10&2 %
Trunk and Clout Nails.....dis 60&10&2 %
Tinned Trunk and Clout Nails.....dis 60&10&2 %
Basket Nails.....dis 60&10&2 %
Common and Patent Brads.....dis 60&10&2 %
Hungarian Nails.....dis 60&10&2 %
Chair Nails.....dis 60&10&2 %
Zinc Glaizers' Points.....dis 40&10&2 %
Cigar Box Nails.....dis 45&10&2 %
Picture-Frame Points.....dis 45&10&2 %
Looking-Glass Tacks.....dis 45&10&2 %
Leathered Carpet Tacks.....dis 45&10&2 %
Brush Tacks.....dis 45&10&2 %
Shoe Finders'.....List Jan. 2, 1888. dis 10 @ 10&5 %
Lining and Saddle Nails, List Jan. 1, 1886:
Silvered.....dis 30&10&10 %
Japanned.....dis 20&10&10 %
Double-pointed Tacks.....85 %
Wire Carpet Nails.....dis 50&10 %
Wire Brads and Nails.....See Nails, Wire
Steel Wire Brads, R. & E. Mfg. Co.'s list....dis 50&10 %

Tap Borers.—Common and Rim.....dis 20&10 %
Ives' Tap Borers.....dis 33⅓&5 %
Enterprise Mfg. Co.....dis 20&10 @ 30 %
Clark's.....dis 33⅓ @ 35 %

Tapes, Measuring.—American.....dis 25&10 %
Spring.....dis 40 %
Chesterman's.....Regular list dis 25 @ 30 %

Thermometers.—Tin Case.....dis 80 @ 80&10 %

Thimble Skeins.—See Skeins.

Ties, Bale.—Steel Wire, Stan'rd list..dis 50&10&5 %

Tinners' Shears, &c.
Shears and Snips (P. S. & W.)...dis 20 @ 25 %
Punches—See Punches.
Snips, J. Mallinson & Co.....dis 33⅓ %

Tinware.
Stamped, Japanned & Pieced, list Jan. 20, 1888.....dis 70&10 @ 70&10&5 %

Tire Benders, Upsetters, &c.
Stoddard's Lightning Fire Upsetters.....dis 15 %
Detroit Perfected Tire Bender.....dis 15 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20&10 @ 30 %
Wood Bottom.....₩ doz $5.00 @ $5.25
All Iron.....₩ doz $4.50
Nashua Clock Co.'s.....₩ doz $15.00, dis 50 @ 55 %
Wilson's.....dis 55 %
Sargent's.....₩ doz $24, dis 55&10 %
Acme.....₩ doz $20.00, dis 40 %

Transom Lifters
Wollensak's Patent Iron Bronzed.....dis 50 %
Reiher's Bronzed Iron Rods list Jan. 1, 1887.dis 50&2 %
Reiher's Real Bronze or Nickel Plate, list Jan. 1, 1887.....dis 50&2 %
Excelsior.....dis 50&10&2 %
Shaw's.....dis 50&10 %
Payson's Universal.....dis 40 @ 40&10 %
Crown and Star.....dis 50 %

Traps.

Game—
Newhouse.....dis 35 @ 40&5 %
Oneida Pattern.....dis 70 @ 70&5 %
Game, Blake's Patent.....dis 40&10&5 %

Mouse and Rat—
Mouse, Wood, Choker.....₩ doz holes, 11@12¢
Mouse, Round Wire.....₩ doz $1.50, dis 10 %
Mouse, Cage, Wire.....₩ doz $2.50, dis 10 %
Mouse, Catch-'em-alive.....₩ doz $2.50, dis 15 %
Mouse, "Bonanza".....₩ gross $10 net
Mouse, Delusion.....₩ gross $18.00, dis 15 %
Rat, "Decoy".....₩ gross $10.00, dis 10 %
Ideal.....₩ gross $10
Cyclone.....₩ gross $5.25
Hotchkiss Metallic Mouse, 5-hole traps....₩ doz 90¢
In full cases.....₩ doz 75¢

Trowels.—Lothrop's Brick and Plastering..dis 25 %
Reed's Brick and Plastering.....dis 15 %
Disston's Brick and Plastering.....dis 25 @ 25&10 %
Peace's Plastering.....dis 25 %
Clement & Maynard's.....dis 20 %
Rose's Brick.....dis 15 @ 20 %
Brade's Brick.....dis 25 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 70 %

Triers.—Butter and Cheese.....dis 25 %

Trucks, Warehouse, &c.
B. & L. Block Co.'s list, 1882.....dis 40 %

Tubes, Boiler.—See Pipe

Twine.

	BC.	B.
No. 9, Flax Twine, ¼ and ½ ₤ Balls....	22¢	30¢
No. 12, " " ¼ and ½ "	21¢	29¢
No. 18, " " ¼ and ½ "	18¢	28¢
No. 24, " " ¼ and ½ "	18¢	28¢
No. 36, " " ¼ and ½ "	16¢	27¢
No. 264, Mattrass, ¼ and ½ "	48 @ 50¢	
Chalk Line, Cotton, ¼ ₤ Balls....	.25¢	
Mason Line, Linen, ¼ "	.55¢	
2-Ply Hemp, ¼ and ½ ₤ Balls (Spring Twine)....	11½¢	
3-Ply Hemp, 1 ₤ Balls....	12 @ 13½¢	
3-Ply Hemp, 1½ ₤ Balls....	11 @ 11½¢	
Cotton Wrapping, 5 Balls to ₤....	15¢ @ 16¢	
2, 3, 4 and 5 Ply Jute, ¼ ₤ Balls....	10¢	
Wool....	6½¢ @ 6¾¢	
Paper....	13¢ @ 14¢	
Cotton Mops—6, 9, 12 and 15 ₤ to doz....	18¢	

Vises.
Solid Box.....dis 60 @ 60&5 %

Parallel—
Fisher & Norris Double Screw.....dis 15&10 %
Stephens'.....dis 25 @ 30 %
Parker's.....dis 20 @ 25 %
Wilson's.....dis 40 %
Howard's.....dis 40 %
Bonney's.....dis 40&10 %
Millers Falls.....dis 40 @ 40&10 %
Trenton.....dis 40&5 - 40&10 %
Merrill's.....dis 15@20 %
Sargent's.....dis 60&10&10 %
Backus and Union.....dis 40 %
Double Screw Leg.....dis 15&10 %
Prentiss.....dis 20&5 @ 25 %
Simpson's Adjustable.....dis 40 %

Saw Filers—
Bonney's, Nos. 2 & 3.....₩ doz $15.00, dis 4 &10 %
Stearn's.....dis 33⅓&10 @ 33⅓&10&10 %
Stearn's Silent Saw Vises.....dis 33⅓ @ 35 %
Sargent's.....dis 66⅔&10 %
Hopkins'.....₩ doz $17.50 dis 10 %
Reading.....dis 40&10 %
Wentworth.....dis 20&10 %
Combination Hand Vise.....₩ gro, $42.00
Cowell Hand Vises.....dis 20 %
Bauer's Pipe Vises.....dis 10 %

Wagon Boxes.
Per lb.....9¢
Wagon Jacks.—Daisy.....₩ doz $4.00, dis 25 %

Washer Cutters.
Smith's Patent.....₩ doz $12.00, dis 40&10&10 %
Johnson's.....₩ doz $11.00, dis 33⅓ %
Penny's.....₩ doz Pol. $14; Jap'd, $16..dis 55 %
Appleton's.....₩ doz $16.00, dis 60&10 %
Bonney's.....dis 30&10 %

Washers.

Size....	¼	5-16	⅜	½	⅝	¾	⅞	1
Washers....	7	5¾	4¾	3¾	3¼	3¼	3¼	3¼

In lots less than 200 ₤, ₩ ₤, add ¼¢, 5-₤ boxes 1¢ to list

Wedges.—Iron.....₩ ₤ 3½¢
Steel.....₩ ₤ 4¢

Well Buckets, Galvanized.
Hill's.....₩ doz., 12 qt., $4.25; 14 qt., $5.25
Iron Clad.....₩ doz., 14 qt., $4.25 @ $4.50
Whiting's Flat Iron Band.....₩ doz $4.25 @ $4.50
Whiting's Wired Top.....₩ doz $4.00 @ $4.25

Well Wheels—8 in., $2.25; 10 in., $2.70; 12 in., $3.25.

Wire.

Iron—
Market, Br. & Ann., Nos. 0 to 18.....dis 70&10&75 %
Market, Coppered, Nos. 0 to 18.....dis 70&70&5 %
Market, Galvanized, Nos. 0 to 18.....dis 65&5 %
Market, Tin'd, Tinned list Nos. 0 to 18.....dis 67½ %
Stone Br. & Ann'd, Nos. 16 to 18...dis 72½&72½&5 %
Stone, Bright & Ann'd, Nos. 19 to 28.....dis 75&75&5 %
Stone, Br. & Ann'd, Nos. 27 to 36.....dis 75&10&5 %
Stone, Tin'd, Tin'd list, Nos. 18 to 36..dis 70&70&10 %
Tinned Broom Wire, Nos. 18 to 24..dis 70&5@70&10 %
Galvanized Fence.....dis 15 %
Annealed Fence, Nos. 8 & 9.....dis 75 %
Annealed Grape, Nos. 10 to 14.....dis 15 %
Brass, list, Jan. 18, '84.....dis 15 @ 20 %
Copper, list Jan. 18, 1884.....dis 20 @ 25 %
Barb Fence.....See Trade Report
Wire on Spools.....dis 65 %
Malin's Steel and Tinned Wire on Spools.....dis 40 %
Malin's Brass and Copper Wire on Spools.....dis 30 %
Cast Steel Wire.....dis 50 %
Stubs' Steel Wire.....$6.00 to $, dis 30 %
Best Music Wire, Nos. 12 to 30.....55¢ ₤
Picture Wire.....dis 60&10 %
Barb Wire Safety Guards.....₩ 1000 $0.00, dis 25 %
Wire Clothes Lines. See Lines.

Wire Cloth, Netting, &c.
Painted Screen Cloth, No. 34, ₩ 100 sq ft.....$1.90
Painted Screen Cloth, No 33, ₩ 100 sq. ft.....$2.00
Galvanized Wire Netting.....dis 70&10 @ 75 %

Wire Goods.—See Bright Wire Goods.

Wire Rope.—List May 1, 1886.....dis 33⅓ %

Wrenches.—American Adjustable.....dis 45 %
Baxter's Adjustable "S".....dis 40&10 @ 50 %
Baxter's Diagonal.....dis 40&10 @ 50 %
Coes' Genuine.....dis 55&3 %
Coes' "Mechanics".....dis 55&10&3 %
Girard Standard.....dis 70&10 %
Machinists, Sterling Wrench Co.....dis 70&10 %
Lamson & Sessions, Engineers.....dis 60&10 %
Lamson & Sessions' Standard.....dis 70&10 %
Coes' Pattern, Wrought.....
Girard Agricultural.....
Lamson & Sessions' Agricultural.....dis 80 @ 80&5 %
Sterling Wrought.....
Bemis & Call's Patent Combination.....dis 35 %
Bemis & Call's Merrick's Pattern.....dis 35 %
Bemis & Call's Brigg's Pattern.....dis 25 %
Bemis & Call's Cylinder or Gas Pipe.....dis 40&5 %
Remis & Call's No. 3 Pipe.....dis 35&5 %
Aiken's Pocket (Bright).....$6.00, dis 50&10 %
The Favorite Pocket (Bright).....₩ doz $4.00, dis 40¢
Webster's Patent Combination.....dis 25 %
Boardman's.....dis 2&10 %
Always Ready.....dis 25&5 %
Alligator.....dis 50 %
Donohue's Engineer.....dis 20&10 %
Acme, Bright.....dis 60&3 %
Acme, Nickeled.....dis 20&3%
Walker's.....dis 55&3 %
Diamond.....dis 40
Diamond Patent Steel.....dis 40

Wringers, Clothes.
List Jan. 10 1888, $2.50 off.

Wrought Goods.
Staples Hooks, &c., is Jan. 12, '87.dis 80&20@50&25

CURRENT METAL PRICES.

OCTOBER 17, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron :	
¾ to 2 in. round and square.. 1 to 6 in. x ¾ to 1 in.....	₩ lb 1.90 @ 2.00¢
Refined Iron :	
¾ to 2 in. round and square.. 1 to 4 in. x ¾ to 1½ in..... 4½ to 6 in. x ¾ to 1 in	₩ lb 2.10 @ 2.2¢
1 to 6 in. x ¼ and 5-16	₩ lb 2.30 @ 2.4¢
Rods—⅝ and 11-16 round and sq..	₩ lb 2.30 @ 2.3¢
Bands—1 to 6 x 3-16 to No. 12.....	₩ lb 2.30 @ 2.4¢
"Burden Best" Iron, base price..	₩ lb 3.00 @ ....¢
Burden's "H. B. & S." Iron, base price.....	₩ lb 2 80 @ ....¢
"Ulster".....	lb lb 3.10 @ ....¢
Norway Rods	4.00 @ 5.00¢

Merchant Steel from Store.

Per pound.

Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots.....	2¾¢ @ 3¢
Best Cast Steel, base price in small lots	8¾¢ @ 9¢
Best Cast Steel Machinery, base price in small lots.....	5½¢ @ 6¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.

	Common American.	R. G.	Cleaned.
10 to 16.....	₩ lb 2.75 @ 2.80¢	3.25 @	....¢
17 to 20	₩ lb 2.85 @ 3 00¢	3.25 @	3.50 ¢
21 to 24.....	₩ lb 3.00 @ 3.10¢	3.50 @	....¢
25 and 26....	₩ lb 3 20 @	3.50 @	....¢
27.....	₩ lb 3.35 @ 3.37½¢	3.75 @	....¢
28.....	₩ lb 3.50 @ .. ..¢	4.00 @	....¢
	B. B.	2d qual.	
Galv'd, 14 to 20,	₩ lb, 4.50 @	4.38 @	....¢
Galv'd, 21 to 24,	₩ lb, 4.87½ @	4.75 @	....¢
Galv'd, 25 to 26,	₩ lb, 5 25 @	5.12 @	....¢
Galv'd, 27.....	₩ lb, 5.62½ @	5.48 @	....¢
Galv'd, 28.....	₩ lb, 6.00 @	5.85 @	....¢
Patent Planished.....	₩ lb A 10¢		B, 9¢
Russia.....	₩ lb 9½¢ @ 10¢		
American Cold Rolled B. B.....	₩ lb 5¢ @ 7¢		

English Steel from Store.

Best Cast	₩ lb 15 ¢
Extra Cast ..	₩ lb 16½ @ 17 ¢
Swaged, Cast.....	₩ lb 16 ¢
Best Double Shear.....	₩ lb 15 ¢
Blister, 1st quality.....	₩ lb 12½¢
German Steel, Best.....	₩ lb 10 ¢
2d quality.	₩ lb 9 ¢
3d quality	₩ lb 8 ¢
Sheet Cast Steel, 1st quality.....	₩ lb 15 ¢
2d quality.....	₩ lb 14 ¢
3d quality.....	₩ lb 12½¢

METALS.

Tin.

	Per lb
Banca, Pigs.....	25¢
Straits, Pigs.....	25¢
English, Pigs.....	24½¢
Straits in Bars.....	26¢

Tin Plates.

	Charcoal Plates.—Bright.	Per box.
Melyn Grade.....	IC, 10 x 14....	$6 00 @ $6.25
" "	IC, 12 x 13.....	6.25 @ 6.50
" "	IC, 14 x 20.....	6.00 @ 6.25
" "	IC, 20 x 28.....	12 50 @ 13.00
" "	IX, 10 x 14....	7.50 @ 7.75
" "	IX, 12 x 12.....	7.75 @ 8.00
" "	IX, 14 x 20.....	7.50 @ 7.75
" "	IX, 20 x 28.....	15 50 @ 16.00
" "	DC, 12½ x 17.....	5.75 @ 6.00
" "	DX, 12½ x 17.. ...	7.25 @ 7.50
Call and Grade.....	IC, 10 x 14.....	6.00 @ 6 26
" "	IC, 12 x 12.....	6.25 @ 6.50
" "	IC, 14 x 20.....	6.00 @ 6.25
" "	IX, 10 x 14	7.50 @ 7.75
" "	IX, 12 x 12.....	7.75 @ 8.00
" "	IX 14 x 20	7.50 @ 7.75
Allaway Grade.....	IC, 10 x 14.....	$5.37½ @ ....
" "	IC, 12 x 12.....	5.50 @ ....
" "	IC, 14 x 20.....	5.37½ @ ....
" "	IC, 20 x 28.....	11.50 @ ....
" "	IX, 10 x 14.....	6.25 @ ....
" "	IX, 12 x 12	6 50 @ ....
" "	IX, 14 x 20	6.25 @ ....
" "	IX, 20 x 28.....	13.00
" "	DC, 12½ x 17.....	.00 @ ....
" "	DX, 12½ x 17.... ...	6.00 @ ....

	Coke Plates.—Bright.	
Steel Coke.—	IC, 10 x 14, 14 x 20	$5.00 @ ....
	10 x 20.....	7.50 @ 7.65
	20 x 28.....	10.25 @ ....
	IX, 10 x 14, 14 x 20.....	5.75
BV Grade.—	IC, 10 x 14, 14 x 20.	4.70 @ ....

	Charcoal Plates.—Terne.	
Dean Grade.—	IC, 14 x 20.....	$4.62½ @ ....
	20 x 28.....	9 25 @ ....
	IX, 14 x 20.....	5.62½ @ ....
	20 x 28.....	11.37½ @ ....
Abecarne Grade.—	IC, 14 x 20.....	4.50 @ ....
	20 x 28.....	9.00 @ ....
	IX, 14 x 20.....	5.50 @ ....
	20 x 28.....	10.80

	Tin Boiler Plates.	
IXX, 14 x 26.....	112 sheets.	$12.50 @ $12.75
IXX, 14 x 28.....	112 sheets....	12 75 @
IXX, 14 x 31.....	112 sheets	14.25 @

Copper.

DUTY: Pig, Bar and Ingot, 4¢; Old Copper, 3¢ ₩ lb. Manufactured (including all articles of which Copper is a component of chief value), 45 % ad valorem.

	Ingot.
Lake.....	@ 18¼¢
"Anchor" Brand.	@ 18 ¢

	Sheet and Bolt.
Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.	

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound. Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30	72	—	25	25	25	26	27	28	31	33
30	—	72	25	25	25	26	28	30	34	....
36	96	—	25	25	25	27	29	33	36	....
36	—	96	25	25	26	28	30	34	38	....
48	96	—	25	25	27	29	31	35	....	....
48	—	96	25	25	28	30	32	36	....	....
60	96	—	25	25	30	32	37	....	....	....
60	—	96	25	26	31	....	....	....	....	....
84	96	—	26	27	..	....	....	....	....	....
84	—	96	27	28	....	....	....	....	....	....
Over 84 in. wide			28	30	....	....	....	....	....	....

	16 oz.	14 oz.	12 oz.	10 oz.
All Bath Tub Sheets.....				
Per pound.....	$0.28	0.30	0.32	0 35

Bolt Copper, ⅝ inch diameter and over, per pound..... 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

Per pound.

14 ounce to square foot and heavier.....	28¢
12 ounce and up to 14 ounce to square foot.....	29¢
10 ounce and up to 12 ounce.....	31¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each.....	8¢
Tinning sheets on one side, 30 x 60 each	30¢
For tinning boiler sizes, 9 in (sheets 14 in. x 60 in.), each.	15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each	12¢
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.) each.....	12¢
Tinning sheets on one side, other sizes, per square foot.....	2½¢

For tinning both sides double the above prices.

Planished Copper.

Planished Copper List May 5, 1888 ....Net

Brass and Copper Tubes.

Seamless Copper.		Seamless Brass.	
⅝ inch ₩ lb.....	50¢	⅝ inch ₩ lb.....	47¢
½ " "	44¢	½ " "	41¢
⅜ " "	42¢	⅜ " "	39¢
¾ " "	40¢	¾ " "	37¢
⅞ " "	39¢	⅞ " "	36¢
1 " "	37¢	1 " "	34¢
1½ " "	34¢	1½ " "	31¢

Roll and Sheet Brass.

Discount from list. ..... .10 @ 15 %

Spelter.

Duty: Pig, Bars and Plates, $1.50 ₩ 100 lb.

Western Spelter.	5½¢ @ 6¢
"Bergenport".....	8¾¢
"Bertha".....	7¾ @ 8¢

Zinc.

Duty: Sheet, 2½¢ ₩ lb.

600 lb casks.....	6¾¢
Per lb	7½¢

Lead.

Duty: Pig, $2 ₩ 100 lb. Old Lead, 2¢ ₩ lb. Pipe and Sheets, 3¢ ₩ lb.

American.....	5½ @ 6 ¢
Newark	5½ @ 6 ¢
Bar.....	6¼¢
Pipe, subject to trade discount.....	7¼¢
Tin-Lined Pipe, subject to trade discount.....	15¢
Block Tin Pipes, subject to trade discount.....	45¢
Sheet, subject to trade discount.....	8¢

Solder.

½ @ ½ (Guaranteed)...	16¢
Extra Wiping	13½¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson...	₩ lb 13¾ @ 14¢
Hallett s	" 11¾¢

Plumbers' Brass Work.

	Discount per cent.
Ground Bibbs and Stops.....	55&10&2
Ground Stops, Hydrant Cocks, &c.....	55&10&2
Corporation Cocks..	55&10&2
Corporation Cocks, "Mueller" Pattern, from Western list.....	55&10&2
Ground Basin and Shampooing Cocks....	50&10&2
Compression Basin Cocks	50&10&2
Compression Basin and Sink Cocks.....	50&10&2
Compression Pantry Cocks.....	50&10&2
Compression Double Basin and Shampooing Cocks	50&10&2
Compression Double Bath Cocks.....	50&10&2
Compression Bibbs, Urinal Cocks, Sill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks.....	50&10&2
Basin Plugs and Basin Grates.....	55&10&2
Bath and Wash Tray Plugs.....	55&10&2
Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets.	55&10&2
Basin Clamps, Basin Joints and Strainers	55&10&2
Boiler Couplings, Ground Face, per set $1.25..	dis 10
Boiler Couplings, Plain Face, per set $1.20..	dis 10
Water Back Valve and Plain Couplings, Soldering Nipples and Unions.....	55&10&2
Union Joints.....	60&10&2
Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides.....	55&10&2
Hose Goods	55&10&2

Steam and Gas Fitters' Brass and Iron Work.

	Discount per cent.
Brass Globe Valves...	60&10&2
Finished Brass Globe Valves, with Finished Brass Wheels.....	40&10&2
Brass Globe Valves, with Patent Wood Wheels.	60&10&2
Brass Globe Angle and Corner Valves.....	60&10&2
Brass Radiator Angle Valves.	60&10&2
Brass Radiator Angle Valves Frink's Patent.	60&10&2
Brass Cross and Check Valves.....	60&10&2
Brass Check Valves...	60&10&2
Brass Hose Valves.....	60&10&2
Brass and Iron Frink Valves	60&10&2
Brass Safety Valves.....	60&10&2
Brass Vacuum Valves.....	50&10&2
Brass Whistle Valves.....	60&10&2
Brass Balance, Back Pressure and Foot Valves.	50&10&2
Brass Butterfly and Throttle Valves.....	50&10&2
Brass Pump Valves.....	50&10&2
Brass Steam Cocks.....	57½&10&2
Brass Service, Meter and Union Meter Cocks.....	57½&10&2
Brass Whistles, Water Gauges and Oil Cups..	60&10&2
Brass Hollow Plug, Tallow and Globe Oil Cups	50&10&2
Brass Lubricators.....	60&10&2
Brass Air Valves.	60&10&2
Brass Air Cocks.....	60&10&2
Brass Gauge Cocks	55&10&2
Brass Cylinder Cocks and Steam Bibbs...	50&10&2
Brass Swing Joints and Expansion Joints.	50&10&2
Brass Test Pumps.	50&10&2
Brass Steam Fittings, Rough.....	60&10&2
Brass Steam Fittings, Finished..	20&10&2
Brass Union Joints.....	60&10&2
Brass Soldering Unions and Nipples ..	55&10&2
Brass Hose Fittings, Fusible and Boiler Plugs.....	55&10&2
Iron Body Globe, Angle, Cross and Check Valves	65&10&2
Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves.....	65&10&2
Iron Cocks, all Iron	65&10&2
All Iron Valves.....	65&10&2

Miscellaneous.

	Discount per cent.
Cast Iron Fittings.....	70&10
Plugs and Bushings	75&10
Malleable Iron Unions...	67½
Malleable Iron Fittings.....	25

Paints.

Black, Lamp—Coach Painters'.....	₩ lb 22 @ 24¢
" Ordinary.....	6¢
Black, Ivory Drop, fair.....	12 @ 15¢
" best.....	23¢
Black Paint, in oil.....kegs, 8¢; assorted cans, 11¢	
Blue, Prussian, fair to best.....	40 @ 55¢
" " " in oil.....	45 @ 55¢
" Chinese dry	70¢
" Ultramarine.....	18 @ 30¢
Brown, Spanish.....	1¼¢
" Van Dyke.....	10 @ 12¢
Dryers, Patent American..ass'd cans, 9¢; kegs, 7¢	
Green, Chrome	15 @ 23¢
Green, Chrome in oil.....	14 @ 18 @ 25¢
Green, Paris.....	good, 20¢; best, 25¢
Green, Paris in oil	good, 30¢; best, 35¢
Iron Paint, Bright Red.....	₩ lb 2¼¢
Iron Paint, Brown	₩ lb 1¾¢
Iron Paint, Purple	₩ lb 3¢
Iron Paint, Ground in oil, Bright Red....	₩ lb 6½¢
Iron Paint, Ground in oil, Red	₩ lb 5½¢
Iron Paint, Ground in oil, Brown.....	₩ lb 5½¢
Iron Paint, Ground, Purple.....	₩ lb 6¢
Litharge.....	6½¢
Mineral Paints	.2 @ 4¢
Orange Mineral	10¢
Red Lead, American.....	6½¢
Red Venetian (Eng.) dry....	$1.65 @ $1.70
Red Venetian in oil.....asst'd cans, 11¢; kegs, 8¢	
Red Indian Dry.	9 @ 12
Rose Pink	.10 @